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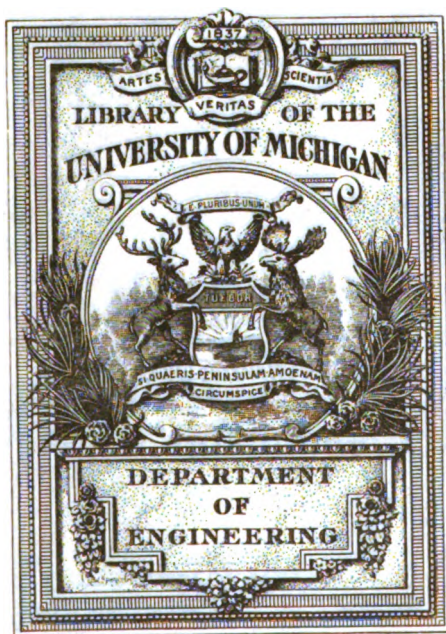
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**DEPARTMENT OF THE INTERIOR**  
**FRANKLIN K. LANE, Secretary**

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**FOURTEENTH ANNUAL REPORT**  
**OF THE**  
**RECLAMATION SERVICE**

**1914-1915**

**A. P. DAVIS, Director and Chief Engineer**  
**WILL R. KING, Chief Counsel**  
**W. A. RYAN, Comptroller**

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**SYDNEY B. WILLIAMSON, Chief of Construction**  
**I. D. O'DONNELL, Supervisor of Irrigation**



**WASHINGTON**  
**GOVERNMENT PRINTING OFFICE**  
**1915**

## ANNUAL REPORTS OF THE RECLAMATION SERVICE.

[Reports may be purchased from superintendent of documents, Government Printing Office, at the price given.]

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- I. June 17 to Dec. 1, 1902; 317 pages, 46 plates, 65 figures, case of drawings. Out of print.
  - II. Through the field season of 1903; 550 pages, 49 plates, 56 figures. Cloth, 85 cents.
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The monthly bulletin of the service, the "Reclamation Record," is printed about the first of each month. It contains 40 or more pages of general news and notes of interest about the projects. The subscription price is 50 cents per year.

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## LETTERS OF TRANSMITTAL.

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DEPARTMENT OF THE INTERIOR,  
*Washington, December 6, 1915.*

SIR: In compliance with the provisions of section 2 of the act approved June 17, 1902, entitled "An act appropriating the receipts from the sale and disposal of public lands in certain States and Territories to the construction of irrigation works for the reclamation of arid lands," I have the honor to transmit the Fourteenth Annual Report of the Reclamation Service.

Very respectfully,

FRANKLIN K. LANE.

THE SPEAKER OF THE HOUSE OF REPRESENTATIVES.

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DEPARTMENT OF THE INTERIOR,  
UNITED STATES RECLAMATION SERVICE,  
*Washington, September 1, 1915.*

SIR: Transmitted herewith is the Fourteenth Annual Report of the Reclamation Service. This report relates in particular to the work completed and in progress during the fiscal year ended June 30, 1915, but contains also information in regard to previous operations, in order that the methods, progress, and results of reclamation work may be more readily understood.

Very respectfully,

A. P. DAVIS,  
*Director and Chief Engineer.*

THE SECRETARY OF THE INTERIOR.



# FOURTEENTH ANNUAL REPORT OF THE RECLAMATION SERVICE.

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## GENERAL DISCUSSION.

Agriculture by irrigation is one of the oldest occupations of civilized man. Various parts of the world show evidences that irrigation was practiced long before any historical record was kept. The remains of prehistoric irrigation works have been identified and extensively traced in southern Arizona along the Salt River and in parts of New Mexico and California.

As a modern activity of the Anglo-Saxon race, however, irrigation in the United States on any considerable scale seems to have had its beginning in Utah in the settlement of the Salt Lake Valley. The early settlements of California, New Mexico, and other arid States extended the practice of the early Spaniards and the Indians, and irrigation development kept pace with the slow settlement of these then remote regions.

During the early history of irrigation farmers and groups of farmers naturally confined their efforts mainly to diverting small streams upon adjacent valleys where the slope of the country and the topography was such as to make the work easy and cheap. With the values of land then existing no expensive enterprise was practicable. Such development proceeding for nearly half a century, widely distributed over the arid region, irrigated in the aggregate a very large area of land. The farmers employed the cheapest class of construction and seldom counted their own time in computing costs, which are hence reported very low.

As land values increased and the easier projects had been developed more and more difficult ones were taken up, sometimes successfully and sometimes not. As the more difficult problems were attacked, corporate capital and the district system were employed and such projects as they could handle were gradually developed. The inherent difficulties, however, did not admit of much profit to the investor. In fact, in a majority of the cases, the investors lost a large part of their capital, to say nothing of interest and profits, and though the general benefits in the development of the country were great and lasting, the losses made it more and more difficult to enlist private capital in further irrigation enterprise.

Various laws were passed from time to time to encourage the irrigation of arid lands, the desert-land act and the Carey Act, with their various modifications, being the most conspicuous examples, but all depending upon the investment of private or corporate capital for actual construction.

The increasing difficulty of carrying out many large projects led to the passage of the reclamation act, with the avowed and widely heralded object of enlisting national funds for the development of projects not feasible by private, corporate, district, or State enterprise. This policy, avowed in Congress and announced repeatedly by the President, was followed by the Reclamation Service.

The projects undertaken, unlike the early simple diversions upon valleys adjacent to the headworks, involved on the contrary expensive storage works, high diversion dams, difficult tunnels, or long expensive canal work upon side hills, where large investment was necessary before any water was brought to the land. Many projects discussed in the early days of the reclamation work were rejected by the Reclamation Service because they were deemed within the reach of private investment. Some of those same projects were afterwards taken up by the Government after years of unsuccessful effort to enlist private capital in their construction.

Practically all of the projects undertaken by the Reclamation Service had been abandoned after unsuccessful attempts to finance them as private projects, or else were new projects so difficult as not to attract even the attention of promoters. All, therefore, were projects unattractive to private capital.

Prior to the passage of the reclamation act the hydrographic branch of the Geological Survey had undertaken surveys of some of the larger and more intricate projects suggested and had made some stream measurements to shed light upon their feasibility. After the passage of the reclamation act this work was greatly expanded and data were rapidly accumulated from which projects were outlined and estimates made, mainly in the years 1902, 1903, and 1904. By this time the program had become crystallized, by which one or more projects in nearly all of the arid States had been undertaken or examined with a view to their early construction. The estimates upon which these projects were based were necessarily the accumulated experience upon previous work of a similar kind which had been carried out within the previous decade. The estimates were, therefore, made upon the basis of work done during the period of depression and low prices from 1892 to 1902. The estimates were made at a time when the country was entering upon a period of rising prices, which, however, was not foreseen by those concerned. The result was that the years 1905, 1906, 1907, and 1908, in which most of the construction work was done, was coincident with a great boom in railroad construction throughout the West, the reconstruction of the city of San Francisco after the fire, and a corresponding expansion of other construction work throughout the arid regions. Unavoidably, therefore, much of the work cost far more than could have been foreseen from the experience of the previous decade. The increased cost of living during the past decade is a rough index to the increased cost of construction. The cost of railroad and irrigation work carried out by private enterprise increased in the same period from 50 to 100 per cent.

The work so far carried out has resulted in the provision of reservoirs, carriage and distributing systems, and other works by which the United States is prepared to deliver water to 1,450,407<sup>1</sup> acres of

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<sup>1</sup> June 30, 1915.

land, of which 761,271 were actually irrigated by settlers in 1914, and this area is considerably increased during the present year. The annual product of this acreage is estimated at over \$16,000,000, and a large number of prosperous homes have been established and many towns and villages have sprung up.

Not all of the settlers, however, have been prosperous, and in the majority of cases the prosperity has not been proportionate to expenditures, nor permitted the settler to make repayments to the Government as promptly and fully as contemplated in the original reclamation act.

### CAUSES OF DISCONTENT AMONG SETTLERS.

The causes for the discontent of the settlers, as gathered from close acquaintance with the work and personal contact with them, are mainly as follows:

1. The law and rulings by which settlers were allowed upon the lands to be irrigated before water was ready for delivery, and even before it was decided that the land could be irrigated at all. In several cases the settler's loss was a total one, the project being rejected by the service. In other cases the settlers moved upon lands years before water was ready, and in endeavoring to hold their homesteads spent all their available funds for living expenses, so that when water was ready for delivery they had nothing with which to prepare the land for irrigation, establish improvements, purchase equipment, or raise a crop.

2. Where the land to be irrigated was privately owned the settler has often paid so high a price that, having exhausted his resources, he is unable to properly prepare the land and make the improvements necessary for success.

3. In some cases the difficulty of subduing the soil has been greater than settlers expected, and this has been aggravated by the inexperience of irrigators who have done insufficient leveling or otherwise inadequately prepared the ground for profitable irrigation.

4. In some cases the settlers were given to understand, by common talk or unofficial opinions expressed during the period of survey, that the cost to the settler was likely to be a certain amount, and these costs have in fact been exceeded.

The most serious and real cause of discontent on the part of settlers is the actual hardships they are undergoing in endeavoring to make a living, and at the same time pay the Government charges without having the experience and financial equipment to make a success under the conditions imposed. There is no way under the law by which the Government can select its settlers, but its officers must receive filings from any eligible person who presents the filing fee at the land office, irrespective of his financial equipment or his ability to make a success of irrigation.

### PREMATURE SETTLEMENT.

The most important phase of this feature is that the law and rulings thereunder permitted settlers to file upon the lands in tracts of 160 acres, even before surveys were made or any decision reached regarding the feasibility of the project.



On the projects that were actually taken up, the public land in many cases was occupied by entrymen who had each filed upon 160 acres, endeavoring to hold a homestead during the years of survey and construction, which was ultimately delayed from lack of funds or other causes. The settlers exhausted all their available funds in living expenses and when the water was ready for delivery were utterly unable to prepare the land properly or to install the improvements and equipment necessary for success on an irrigated farm. In every case the prospective value of the land with a water right was greater than the cost of the water right, so that the settler became anxious to hold his entire tract of 160 acres or as much thereof as possible. This pressure exerted upon the local men and upon the Washington authorities through Representatives and otherwise led to the establishment of farm units, usually 80 acres or more, where half the size would have been more appropriate, and the impoverished settlers were burdened the first few years with charges upon a large area of land, none of which they were able to cultivate properly, owing to lack of preparation and of equipment; in short, they were attempting the impossible.

A typical example is on one project where the average irrigable area of the holdings is 65 acres, while the average cultivated area is 25 acres. The average farmer is thus struggling under the dead load of charges upon 40 acres, which he is unable to use, but which are burdensome in the matter of fencing and otherwise. Where a farmer has an excess area he is almost sure to cultivate more land than he can properly level and provide with irrigating ditches, so that he obtains inferior results even from the acreage which he does cultivate.

#### SIZE OF FARM UNIT.

Montana and Wyoming, the coldest States in the reclamation area, furnish striking illustrations of the wisdom of a small farm unit for the average settler. In the Yellowstone Valley, Mont., is the Huntley project, which is unique in having been specially initiated by an act of Congress, opening to settlement a portion of the Crow Indian Reservation. The special law gave the Secretary authority, not found in the reclamation act, of withholding the land from settlement until water was provided. It was then opened in tracts of 40 acres, a few fractional areas around the margin increasing the average area to 43 acres. The settlers came when invited, and although confronted by the usual hardships of a newly irrigated region and a rigorous climate, have almost universally succeeded, and the Huntley project is one of the most prosperous in the service, there being scarcely any delinquent payments and graduation or deferment of payments having never been requested. Had a similar discretion been exercised with reference to the other public-land projects a great deal of the discontent upon them now observed would be lacking.

On the Shoshone project in Wyoming, which is somewhat higher and colder than the Huntley project, the farm units are 40 acres in the neighborhood of towns and 80 acres farther out. The smaller tracts have usually been taken first, and business men of the valley request that when additional land is opened the proportion of 40-acre tracts be increased, as the settlers on these tracts are more likely to

succeed, and more homes are thus provided, which increases the prosperity of all.

The law of 1910 providing for an advance of \$20,000,000 to the reclamation fund also provides that the settlers shall not be allowed upon public land until water is ready for delivery and the price announced. This law, while obviating many difficulties as to the future, can not be made retroactive, and does not help matters on existing projects, and furthermore had the effect to withhold from settlement and cultivation lands to which water could be delivered but as to which the construction charges could not be fixed. By the enactment of the reclamation extension act of August 13, 1914, provision is now made for the settlement of farm units whenever water is ready for delivery thereon, the settlers to pay an annual rental charge for the use of the water.

### PRIVATE HOLDINGS.

Holding of larger areas of land than the settler is able properly to improve, stock, and cultivate is by no means confined to public lands. While the tendency to take excessive areas is not so great where a purchase price must be paid by the settler, yet this same purchase price, by having payments deferred with interest and remaining as a first lien upon the land and improvements, frequently so burdens the settler that he is unable to make the proper investments in improvements and in the domestic animals necessary to profitable farming. In the case of the settler who already owned land upon a project undertaken, the tendency is for him to hold as much land as the law will permit him to purchase a water right for and to hold the remainder for the rise in value expected from the construction of Government works, or to sell it at a figure which will fully discount all its value. The result is that the newcomer purchasing such land is burdened with debt and deprived of the capital that should be invested in developing, improving, and stocking his farm, and has to pay annual interest charges that sap his resources and hamper all his efforts.

The original reclamation act provided that a Government water right should not be sold for an area exceeding 160 acres in one holding, and this has, of course, been followed. This provision, however, did not prevent the landowner from holding land at a price that discounted the added value conferred by the water right, for the logic of the situation enabled him to convince the purchaser that once the land was in the hands of a small holder the law would not prevent the purchase of water right and the economy of including the area within the project would induce the Government to sell him the water right.

The problem of excessive holdings was early attacked by the officials of the Reclamation Service who recognized the necessity of forcing the subdivision of large holdings and adopted a rule by which prior to taking up the project the owners of excess areas were required to execute an instrument binding themselves to sell the excess holdings in small areas to persons eligible to acquire water rights, failing which the Government was given the right to enforce its sale at auction at the specified time. Such contracts have been enforced in a few instances, but in others have led to long-drawn-out

litigation with no substantial result. At best, this proviso does not prevent the selling of the land at boom prices which load the settler with debt and jeopardize his success.

The reclamation extension act seeks to apply another remedy by the provisions of section 12, which require that excess areas not only be sold, but at such a price as the Secretary of the Interior may designate. This provision promises little relief, as it can not be applied to projects already taken up; and wherever applied, though it may limit the price at which the present holder can sell the land, there is nothing to prevent the buyer from selling to the actual settler at such price as he is able to extort. It merely results in the introduction of a middleman, which process is as likely to extort all the traffic will bear as the provisions of the original law.

So long as the value that attaches to land goes into private pockets there appears to be no escape from the fact that the benefits of all public improvements, including irrigation works, inure to the benefit of landowners almost exclusively.

### SOIL CONDITIONS.

It has been customary for the Reclamation Service to secure the best soil experts available, usually from the Bureau of Soils, to examine the soil of each contemplated project, and on the basis of their examination to classify the lands into irrigable and nonirrigable land. Necessarily the dividing line between fertile and infertile soil is very indefinite, and the best of opinions will differ and are apt to be in error. Some cases have occurred where tracts have been included in the irrigable area that have presented new or unexpected difficulties by reason of their coarse, sandy character, requiring an excessive amount of water and attention, or, on the other hand, of their close, heavy texture or the presence of too much alkaline salts. Such conditions render more difficult the subjugation of the soil, which at best in a desert region is difficult with the limited means at the disposal of the average settler.

In some cases also the rise of ground water, resulting from over-irrigation or seepage from canals, has destroyed the fertility of lands otherwise fertile. The latter difficulty has been remedied largely by the construction of drainage works, but not until after some hardship had been suffered by some of the settlers.

It has been the practice of the department to suspend payments upon lands that have been injured by ground water or otherwise proved to be infertile. These difficulties are somewhat sporadic, and would usually not be important if not aggravated by the condition previously set forth of the lack of capital of the settler beset with many burdens.

### EXCESS COST.

The excess of cost upon various projects above that expected by the settlers, about which much has been said, is due to two general causes, the most important of which is the different meanings attached to the phrase "the cost of the project."

During the agitation for the reclamation act and in the early days of its operation it was the expectation that the Government would

build only the larger works, such as storage reservoirs, diversion works, main canals, tunnels, etc.; and during the early period of surveys it was upon the construction of such works only that opinions were generally passed, and many of these were the opinions of irresponsible promoters or "boosters," which, however, received general currency and credence. The expectation that the settlers would themselves provide the distributing system and all of the smaller works by cooperative effort was disappointed, as they were uniformly unable or unwilling to do this; and in order to relieve individual hardship and get the systems in operation it was necessary for the Government to bring the work to a far more complete state than was previously contemplated. To this has frequently been added the necessity of providing drainage works, which it was originally expected would be carried out by local district effort, as is customary on private projects.

It is, however, a fact that nearly all of the earlier works were more expensive than the engineers' estimates for the same work, due mainly to the radical change in economic conditions between the years preceding the passage of the reclamation act, upon which estimates were necessarily based, and the period from 5 to 10 years later during which most of the works were built. The great increase in the cost of labor and material, which is reflected throughout the land in the higher cost of living, was more pronounced in the West than in the East, and applied especially to the period, from 1904 to 1908, during which the heaviest construction was carried out.

The most important element in this increase of cost was the item of labor. Not only did the actual price of common labor advance from 20 to 50 per cent, but the efficiency fell off in a greater proportion. These influences were not much felt on established business enterprises, where labor of average intelligence and sobriety was steadily employed; but on construction work, where employment was necessarily limited to the construction season, it was usually impossible, owing to the scarcity of labor, to secure any except the floating or itinerant element, and these men, never very efficient and conscious that they could pick up a job any place, did not exert themselves, and would remain only long enough to get a few dollars and then, for trivial reasons, would quit, and necessitate shipping in additional men. It became necessary on all large work to ship common labor from the centers of population, such as Chicago, Omaha, and Kansas City. These laborers were hired under contract to work at a certain rate and had their railroad fare deducted. To avoid this deduction from future wages they would desert if possible before reaching the point of labor, or quit soon after. Thus all heavy work of a temporary character was kept under constant expense shipping in laborers, paying them high wages, and receiving little benefit. In a less degree, costs were affected by the increased price of material and equipment. This was especially true of horses and mules, which nearly doubled in price in the five years mentioned. Lumber, steel, and cement not only materially advanced in price, but it was at times impossible to obtain them when needed, and work was delayed and expense increased in consequence. The congestion in freight in 1906 and 1907 was also a prolific source of delay and consequent increased costs.

Where work on earlier projects was let to a limited extent at from 9 to 14 cents per cubic yard in 1904 and 1905, the same character of work nearly doubled in price within two years, and many contractors found it impossible to carry out work at the price contracted, so sudden was the advance in many localities.

### **THE EXTENSION ACT.**

Recognizing the difficulties above enumerated, Congress undertook to meet the situation by the passage of the reclamation extension act, which, among other changes in the existing law, increased the term of payment for water right from 10 years to 20 years, making the average payment 5 per cent of the total charge, and so graduating this as to make the payments lighter than this in the early years.

This law has resulted so far in inspiring new courage in many of the settlers and materially assisting them to get on their feet, not only by leaving their capital with them, but by improving their credit through brightened prospects. While it is too early to predict all results with accuracy, it can safely be said that the chance of success on many of the projects is improved, both from the standpoint of the settlers' welfare and of the recovery of the reclamation fund from the lands benefited.

Other measures of an executive nature have been adopted improving the relations between the water users and the Government, among which may be mentioned increased emphasis placed upon the policy of publicity of plans and accounts, by which the water users are kept informed of the expenses incurred on their behalf and of the plans concerning the handling of the project. Where feasible to do so, the advice of the water users has been sought and obtained upon important matters of policy affecting their welfare. Such advice has usually been granted in the spirit in which it was sought and in many cases has been distinctly helpful.

### **BOARDS OF REVIEW.**

The most important move in this direction, however, has been the organization of boards to review the cost on the various projects.

Many allegations have been made from time to time that various items of expenditure have been charged to the projects which are not proper items in making up the estimate of cost contemplated by the reclamation act. As some of these involve questions of fact and others nice distinctions of opinion, it was decided to organize competent and impartial boards to review these costs and submit reports thereon. These reports were referred to a central board of review consisting of three men of recognized character, ability, and standing, who would review the work of the local boards and submit report and recommendations to the department.

The local boards of review were formed by the selection by the water users of each project of one representative to review that project, and the selection by the Reclamation Service of a representative for the same project, thus forming two of the three members. The members thus selected from each project in each supervisory division met at some central point and after conference selected three names to be submitted to the department as suggestions for the third mem-

ber of the board. From the three names submitted by this joint conference the Secretary selected one to serve as chairman for all projects in that district. These reviews are now in progress, many of the reports of local boards having been submitted to the central board and being now under consideration. They point out many minor opportunities for financial adjustment which are obviously just and in accordance with existing laws. It is probable that some suggestions will result which may lead to recommendations for legislation. It is believed that increased confidence in the fairness of the Government has resulted from this move, but it is as yet too early to make any authentic announcement of results.

### DENVER OFFICE.

During the last two years an inquiry has been prosecuted in the methods of conducting the field and office work of the Reclamation Service with a view to possible economies of administration, and as a result it has been decided to establish a central office in the West, at Denver, for the supervision of such work of the service as can be economically and efficiently performed at that point. The disbursements of the service have been consolidated in that office, and the supervisory districts into which the work has heretofore been divided have been abolished. The Denver office also undertakes to supervise and largely to conduct the purchases required in carrying on the work. It is hoped that the centralization of this work in Denver will result in important economies.

### PRINCIPAL CONSTRUCTION WORK FOR THE YEAR.

The Salt River project has been practically completed, the only remaining construction work now contemplated being some repair work on the reservoir spillway and the completion of the installation of the sixth power unit at the reservoir. The reservoir filled and overflowed for the first time in April, 1915, and is still nearly full. This reservoir holds more than twice as much water as is needed in one year on the project, so that the water now on hand is a guarantee against drought for a long time to come. The project is now ready for opening, and it is expected that this will be undertaken at an early date.

The work on the Yuma project has been mainly the completion of the distribution system in the lower valley and the prosecution of the river protection works along the Colorado River.

On the Orland project the feed canal has been completed from Stony Creek to the East Park Reservoir, which makes a secure water supply for 20,000 acres of land, and the construction of a distribution system to this acreage is nearing completion.

Work on the Grand Valley project has been vigorously prosecuted, and the diversion dam in the Grand River, with its movable crest of rolling weirs, has been completed. Work is in progress on the main canal and lateral system, and the priming of the main canal has been started.

On the Uncompahgre project work has been continued in the extension of the distribution system and in the acquisition of the Ironstone and Loutzenhizer systems, according to the general plan of unification.

The Arrowrock Dam on the Boise River in Idaho, one of the largest structures yet undertaken by the Reclamation Service, is practically completed, and all of the water available for storage during the present year was stored, and is in great demand in the valley below, the present year being the driest of record. The storage in this reservoir will be of immense value to the Boise Valley this year. Drainage works have been constructed in the Pioneer irrigation district under a contract by which the district agrees to repay the cost of drainage and to undertake the collection of the payments for water-right charges upon all the lands in the district not previously having a complete water right. Similar contract is now pending with the Nampa-Meridian district.

Work is being continued on the enlargement of the outlet works at Jackson Lake under contract with the Kuhn Irrigation Co. and the Twin Falls Canal Co., which are advancing the funds to cover the cost and will obtain the benefit of storage from the enlarged works.

Construction is in progress on the Sherburne Lakes Reservoir Dam for the storage of the water of Swift Current Creek for use in the Milk River Valley. Construction is also in progress on the St. Mary Diversion Canal, which will carry the water of the St. Mary River to the Milk River Valley. The distribution system in the Milk River Valley is also under construction, and the Vandalia diversion dam has recently been completed, except the movable crest.

Construction is actively under way on the main canal and distribution system of the Sun River project, and it is expected that a considerable acreage will be irrigated next year.

Construction work has been started on the Fort Laramie unit of the North Platte project on the south side of the North Platte River, and the Minatare storage dam on the north side of the river has just been completed.

The Lahontan storage reservoir on the Truckee-Carson project has been completed and put in operation. The United States has also acquired the outlet works at Lake Tahoe, and these have been enlarged in capacity to make available a considerable storage from that lake.

The Elephant Butte Dam on the Rio Grande, the largest structure yet undertaken by the Reclamation Service, is nearing completion, and a large quantity of water is already stored in the reservoir to guarantee against shortage of water to all of the lands that can be served by canals at the present time. The distribution systems are being rapidly improved, enlarged, and extended.

Work has been actively in progress on the west extension of the Umatilla project, and it will be possible to deliver some water for irrigation during the season of 1916.

Work has continued on the distribution system of the Strawberry Valley project, and water has been delivered on a rental basis from the reservoir through the Strawberry Tunnel.

The Okanogan project has been completed by the construction of the power and pumping plants, which serve water from the Okanogan River to lands on Robinson Flat.

The Sunnyside Canal has been extended in the Yakima Valley, Wash., and work is being vigorously prosecuted on the storage reservoir at Lake Keechelus.

The details of construction and other operations will be found in appropriate places under the respective project headings.



**SECONDARY AND COOPERATIVE PROJECTS.**

In addition to the primary irrigation projects which have been approved by the Secretary of the Interior for detailed investigation or for construction, and which are discussed on subsequent pages, a number of secondary projects have been investigated at various times since the organization of the Reclamation Service. The work on the secondary projects has in general been limited to the gathering of information as to water supply and the determination of the character and extent of irrigable lands.

The following secondary projects have been investigated:

Arizona: Little Colorado, San Carlos, and San Pedro.

Arizona-California: Colorado River.

California: Owens Valley, Sacramento Valley, San Joaquin, Iron Canyon, Pit River, Shasta and Lassen counties Cooperative.

Colorado: White River.

Idaho: Dubois and Port Neuf, King Hill.

Montana: Clark Fork, Crow Reservation, Lake Basin, Madison River, and Marias.

Nebraska: South Platte, Nebraska Cooperative.

Nevada: Walker River.

New Mexico: La Plata, Las Vegas, and Urton Lake.

North Dakota: Bismarck, Little Missouri, Nesson, Washburn, and Bowman.

Oklahoma: Cimarron, Red River, and Oklahoma Reservation.

Oregon: Malheur, Central Oregon, Columbia River, and Oregon Coop.

Utah: Bear Lake, Utah Lake, and Provo-Weffer.

Washington: Palouse, Palouse Cooperative, Priest Rapids, Wapato, Benton, and Kittitas.

Wyoming: De Smet.

Information relative to these projects can be found in preceding reports.

**SUMMARY OF CONSTRUCTION RESULTS.**

The following table gives in concise form many of the items which have been accomplished. A more detailed table, by projects, will be found in the appendix:

*Summary of construction results, June 30, 1915.*

**LANDS.**

Items.	To June 30, 1915.		To June 30, 1914.		Increase.	
	<i>Acres.</i>	<i>Farms.</i>	<i>Acres.</i>	<i>Farms.</i>	<i>Acres.</i>	<i>Farms.</i>
Estimated area 29 projects on completion.....	3, 118, 011	60, 603	2, 921, 166	58, 323	196, 846	2, 280
Estimated area to which service was prepared to supply water.....	1 1, 450, 407	29, 017	1 1, 343, 193	27, 115	107, 214	1, 902
Under contract—						
Water rights.....	461, 632	10, 122	418, 644	8, 559	44, 988	1, 563
Rental contracts, etc.....	626, 371	13, 008	566, 843	12, 416	59, 528	592
Total.....	1, 088, 003	23, 130	983, 487	20, 975	104, 516	2, 155
Reservoir capacity available, acre-feet.....	6, 500, 360	.....	5, 460, 510	.....	1, 039, 850	.....

<sup>1</sup> Estimated on June 30. More accurate figures made up at end of year.

*Summary of construction results, June 30, 1915—Continued.*

## CANALS, DITCHES, AND DRAINS.

Items.	To June 30, 1915.	To June 30, 1914.	Increase.
	<i>Miles.</i>	<i>Miles.</i>	<i>Miles.</i>
Canals over 800 second-feet capacity.....	359	325	34
Canals 301 to 800 second-feet capacity.....	610	538	72
Canals 50 to 300 second-feet capacity.....	1,420	1,318	102
Canals less than 50 second-feet capacity.....	6,371	5,826	545
Total canals.....	8,760	8,007	753
Ditches and open drains.....	883	848	35
Grand total canals, ditches, and drains.....	9,592	8,855	1,037

## TUNNELS.

Number.....	89	86	3
Length.....feet..	133,300	129,341	3,959

## DAMS: STORAGE AND DIVERSION.

	<i>Cubic yards.</i>	<i>Cubic yards.</i>	<i>Cubic yards.</i>
Masonry.....	1,992,502	1,346,904	645,598
Earth.....	9,231,109	8,817,236	413,873
Rockfill and crib.....	978,474	704,784	273,690
Total.....	12,202,085	10,868,924	1,333,161

## DIKES AND LEVEES.

Mileage and volume.....	90.6	<i>Cubic yards.</i> 4,076,766	85.4	<i>Cubic yards.</i> 3,790,950	5.2	<i>Cubic yards.</i> 285,816
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## CANAL STRUCTURES.

	Concrete	Wood.	Concrete.	Wood.	Concrete.	Wood.
Costing over \$2,000.....number..	730	107	645	75	85	32
Costing \$500 to \$2,000.....do.....	1,482	323	1,264	206	218	117
Costing \$100 to \$500.....do.....	6,696	4,129	5,978	3,748	713	351
Costing less than \$100.....do.....	7,226	44,154	5,622	37,087	1,604	7,067
Total.....	16,134	48,713	13,509	41,116	2,625	7,597

## BRIDGES.

	Number.	Length.	Number.	Length.	Number.	Length.
		<i>Feet.</i>		<i>Feet.</i>		<i>Feet.</i>
Steel.....	85	5,433	84	5,337	1	96
Combination.....	240	7,311	195	6,094	45	1,217
Wood.....	4,013	85,922	3,398	70,603	627	15,319
Concrete.....	284	3,740	210	3,191	74	549
Total.....	4,622	102,406	3,875	85,225	747	17,181

## CULVERTS.

Concrete.....	1,273	61,112	1,120	51,105	153	10,007
Metal.....	1,146	40,119	890	26,338	266	13,781
Terra cotta.....	567	29,052	306	16,191	261	12,861
Wood.....	2,728	62,663	2,329	54,629	399	8,035
Total.....	5,714	192,946	4,635	148,262	1,079	44,684

*Summary of construction results, June 30, 1915—Continued.*

## PIPE.

Items.	To June 30, 1915.	To June 30, 1914.	Increase.
Concrete.....	486,635	454,584	32,051
Metal.....	193,541	153,638	39,903
Terra cotta (tile).....	634,108	451,928	182,180
Wood.....	260,676	192,036	68,640
Total.....	1,574,960	1,252,186	322,774

## FLUMES.

Concrete.....	33	4,189	29	3,123	4	1,068
Metal.....	407	112,533	297	90,126	110	22,407
Wood.....	1,461	335,324	1,264	328,375	197	6,949
Total.....	1,901	452,046	1,590	421,624	311	30,422

## CANALS LINED.

Concrete.....	Miles.	140.5	Miles.	86.4	Miles.	54.1
Wood.....		3.0		1.7		1.3

## BUILDINGS.

Offices.....number..	75	74	1
Residences.....do...	520	483	37
Power plants.....do...	19	13	6
Pumping stations.....do...	64	63	1
Barns, storehouses, etc.....do...	390	385	5
Total.....	1,008	1,018	50

## WELLS.

Number.....	367	361	6
Depth.....feet..	29,337	28,717	620

## COMMUNICATIONS.

Roads.....miles..	784	733	51
Railroads.....do...	82	78	4
Telephone lines.....do...	2,554	2,376	178
Phones.....number..	1,069	1,003	66
Transmission lines.....miles..	429	402	27

## POWER DEVELOPED.

Water.....horsepower..	30,276	29,126	1,150
Steam.....do.....	4,250	4,250	.....
Total.....do.....	34,526	33,376	1,150

*Summary of construction results, June 30, 1915—Continued.*

## EXCAVATION.

Items.	To June 30, 1915.	To June 30, 1914.	Increase.
Class 1 earth.....cubic yards..	115, 699, 264	100, 432, 925	15, 166, 359
Class 2, indurated material...do....	7, 585, 948	6, 688, 156	917, 792
Class 3, rock.....do.....	6, 964, 136	6, 067, 391	896, 745
Total.....do.....	130, 149, 368	113, 188, 472	16, 960, 896
Coal mined.....tons.....	52, 680	39, 474	13, 206
Riprap.....cubic yards.....	1, 023, 398	616, 493	406, 905
Paving.....square yards.....	615, 583	564, 037	51, 546
Concrete placed.....cubic yards.....	2, 674, 977	1, 933, 283	741, 714
Cement used.....barrels.....	2, 501, 382	1, 965, 499	535, 883
Cement manufactured by Reclamation Service.....barrels.....	338, 452	338, 452	.....
Sand cement manufactured by Reclamation Service.....barrels.....	1, 177, 215	597, 916	579, 299

## RESULTS OF RECLAMATION.

The object of the reclamation law is home making on the arid lands—the conversion of desert tracts into self-supporting agricultural communities. This object is not obtained by the construction of irrigation works alone, however elaborate or efficient these may be in design and operation. In fact more difficult than the engineering problems involved in reclamation are those of settlement and successful utilization of the irrigation system and water supply by the farmers. Obviously without successful agricultural development a project may be a failure, regardless of the perfection of the engineering work. Thus even the sufficiency of the water supply and successful operation of the irrigation system are only incidental to the ultimate object sought by the Government as well as the irrigator, and the success of the Government's undertaking is inseparably connected with that of the water user.

It follows that to show the year's progress in reclamation work it is necessary to show the results obtained by the farmer as well as those of the engineer. Reclamation is measured not in engineering units, but in homes and agricultural values. As the projects of the Reclamation Service have reached the stage of development where water has been delivered to the farms an effort has been made to gather data showing the results accomplished by the irrigators. The collection of these statistics has gradually become systematized and is now known as the water-user census. Most of the figures are obtained by the canal riders or patrolmen at the close of the irrigation season, when the decreasing demand for water, while requiring their rounds for occasional deliveries, permits at the same time the collection of statistics from the water users by the employees of the service who are in closest touch with the farmers. This method of gathering the data is not only economical, but probably tends to greater accuracy than obtained in the ordinary census.

It should be borne in mind that the figures thus secured cover all the project farms and the total areas irrigated and cropped. The figures thus show what is actually being accomplished and what may be expected of the average settler. It is not to be supposed that true averages like these will agree with the results often cited by the

speculator or realty salesman. The latter figures are not likely to represent such an average although they may be correct statements of what is and can be accomplished by any successful farmer.

The results of the 1914 census are given in detail in the tables of the appendix. The principal figures are summarized in the appended table.

*Irrigation and crop results on Government reclamation projects, 1914.<sup>1</sup>*

Project.	Irrigable acreage. <sup>2</sup>	Irrigated acreage.	Cropped acreage.	Value of crops.	
				Total.	Per acre cropped.
Salt River.....	187,112	* 173,030	169,719	\$4,039,079	\$23.80
Yuma.....	60,000	25,207	22,568	709,409	31.43
Orland.....	14,300	7,354	6,540	176,331	26.99
Uncompahgre Valley.....	52,338	33,873	33,091	870,381	26.30
Boise.....	207,000				
Farms reported.....		64,767	58,064	1,033,447	17.80
Farms not reported <sup>4</sup> .....		18,823	16,868	300,140	17.80
Mmldoka.....	117,090				
Gravity unit.....		45,730	39,138	661,796	16.91
South Side pumping unit.....		35,788	33,512	568,059	16.65
Huntley.....	28,808	17,068	17,068	454,563	26.63
Milk River.....	13,440	2,201	2,163	34,618	16.00
Sun River.....	16,346	6,613	6,561	106,594	16.25
Lower Yellowstone.....	36,250	5,743	5,621	96,707	17.20
North Platte.....	91,504	60,532	59,536	890,202	14.95
Truckee-Carson.....	52,039	39,516	39,285	441,018	* 11.23
Carlsbad.....	20,261	12,690	10,731	237,663	22.15
Hondo.....	1,224	1,224	1,172	21,458	18.31
Rio Grande.....	40,000	28,442	27,302	1,180,720	42.51
North Dakota pumping.....	12,239	1,056	1,045	36,440	34.87
Umatilla.....	17,000	5,102	3,013	88,614	29.41
Klamath.....	38,000	24,440	24,440	347,344	14.22
Belle Fourche.....	68,852	37,454	36,709	461,188	12.56
Okanagan.....	10,099	7,740	3,180	104,575	32.88
Yakima:					
Sunnyside unit.....	81,807	64,052	49,273	2,858,845	58.02
Tieton unit.....	34,000	20,600	15,920	472,480	29.60
Shoshone.....	41,166	22,226	20,905	313,826	15.01
Total.....	* 1,240,875	761,271	708,424	16,475,517	23.50

<sup>1</sup> Data are for calendar year (irrigation season) except on Salt River project, Arizona, data are for corresponding agricultural year, October, 1913, to September, 1914. Figures are for reclamation projects only, excluding three Indian projects in Montana partially completed and under construction by the Reclamation Service for the Indian Service.

<sup>2</sup> Area Reclamation Service was prepared to supply water during season of 1914. Corrects figures estimated on June 30, 1914, as shown in thirteenth annual report. The latter figures also include three projects in Montana being constructed by the Reclamation Service for the Indian Service, which are excluded from this table.

<sup>3</sup> Government project only, exclusive of towns and Tempe Canal lands.

<sup>4</sup> Except irrigated acreage, estimated from figures for reported farms.

<sup>5</sup> \$18.22, excluding 19,398 acres native pasture land, at \$1.21 per acre, and 4,908 acres otherwise not in full production.

On all the reclamation projects in 1914 water was served to 761,271 acres, but the projects were sufficiently constructed so that the Reclamation Service was prepared to supply nearly twice that area, or 1,240,875 <sup>1</sup> acres. The difference is made up of private and State land under ditch, but not brought into production, public land not entered, and unirrigated portions of the farms in use. The latter item is a large one, approximating one-half the unused part of the area for which water was available.

The problem of bringing these unused tracts into production is one of immediate importance. This is true from the point of view of the Government, because these areas are depended upon to return in

<sup>1</sup> These figures cover reclamation projects only, exclusive of three Indian projects in Montana.

building and operation charges the large investments that have been made from the National Treasury, and such return to the reclamation fund will make possible further additions to the irrigated and producing area of the country. It is also true from the standpoint of the settler, because the growth of the community means for him better values, better markets and facilities, and improved social conditions generally.

Of special importance to the settler is the problem of developing his entire farm. His water charges are based on the total irrigable area, not only the part actually watered. His chances of making these payments and meeting the overhead expense of his farm operations out of his receipts for crops and live stock are materially improved when he has brought his whole farm into production. In 1914 the water users irrigated 760,000 and cropped 700,000 acres, but the irrigable areas of their farms totaled very close to 1,000,000 acres. Thus the total crop value, while enormous in the sum and averaging \$23.50 per acre cropped, drops to \$17.00 per acre irrigable—that is, for each acre of these farms liable to charges—and to \$13.30 for each acre for which the service was prepared to supply water on the projects as a whole.

On the other hand, there is the danger that the irrigator will attempt too much for his resources and scatter his efforts over an area entirely too large for him to handle intensively, actually reducing his crop value or so increasing his costs as to lower his net income. A wise check on this is the provision in the reclamation law for a restricted farm unit on public lands and on private lands that may be supplied water.

#### PRODUCTION IN 1914.

Nearly \$16,500,000 is the estimated value of all irrigated crops raised on the Government projects during 1914. This is a greater sum than reported for the State of New Hampshire in the last census of the United States and four times as large as that for Delaware. It represents an average return of \$23.50 per acre on over 700,000 acres from which crops were harvested on the projects.

The Salt River project, Arizona, was the greatest contributor to the total value, producing a crop estimated at over \$4,000,000, or nearly one-half the value of the total crop of that State. The Yakima project, Washington, comes next, with a total crop value of nearly \$3,500,000 from the Sunnyside and Tieton units. The Sunnyside unit exceeds all others in the average return per acre, due largely to the very valuable crop of famous Yakima Valley fruit raised on that unit. Fruit was harvested from nearly 10,000 acres on the Sunnyside unit in 1914, and the yield averaged over \$110 per acre. On the whole unit about 50,000 acres were cropped, returning close to \$60 per acre.

In comparison with preceding years crop conditions on the projects in 1914 were generally normal, most of the adverse influences being local, such as overproduction of certain crops or the development of insect pests. Yields were generally equal to those of 1913 or slightly better, but this was more than offset by a reduction in prices, usually slight, but for some crops and projects a very material factor. The European war had its effect, especially in the depreciation of the cotton crop now produced on three of the projects.

*Summary of crops grown on reclamation projects, 1914.*

Crop.	Area cropped.		Yields.			Crop value.		
	Total.	Per cent.	Unit.	Total.	Average per acre.	Average per acre.	Total.	Per cent.
	<i>Acres.</i>							
Cereals.....	183,756	26	Bu....	4,495,836	25	\$16.00	\$2,034,521	18
Other grain and seed....	84,100	5	Bu....	433,942	14.5	17.00	583,251	4
Alfalfa.....	329,676	47	Ton....	1,027,002	3.1	19.00	6,312,169	38
Hay and forage <sup>1</sup> .....	444,300	63	Ton....	1,073,197	2.4	16.50	7,351,824	45
Fruit and nuts.....	19,826	3	Lb....	127,321,811	6,400	96.00	1,900,391	12
Vegetables and truck....	33,450	5				59.00	1,974,651	12
Sugar beets.....	12,753	2	Ton....	121,831	9.6	57.00	722,349	4
Cotton.....	15,072	2	Lb....	5,132,340	340	55.00	825,055	5
Other crops.....	2,201	0.3					177,405	1
All crops.....	703,424	100				23.50	16,475,517	100

<sup>1</sup> Including alfalfa.

A total of 703,424 acres were harvested or pastured on all the projects during 1914. The character and distribution of crops remained practically as in the preceding year, as described in the thirteenth annual report of the service. Some progress was indicated by the slightly smaller proportion of the cropped area devoted to grain and a gain in the areas of alfalfa and fruit. Alfalfa was cut on 329,676 acres, and all hay and forage comprised 444,300 acres, or 63 per cent of the total cropped area, while cereals were harvested from 183,756 acres, or 26 per cent of the total area, so that these two classes of crops comprised about 90 per cent of the total area in production. Alfalfa will doubtless continue for some time to be the leading crop on most of the projects. In 1914 it was harvested from almost half the producing area and provided nearly 40 per cent of the total crop value. The substitution of alfalfa for grain, grown as a nurse crop, or as a first ready-money crop after breaking in the land, is a common step in the early development of the irrigated farm and makes for soil betterment, as well as better values, but a number of the projects suffered during 1914 from a local excess of alfalfa hay, resulting in a considerable reduction of price and returns to the farmer. The cure for this condition lies not in the growth of less alfalfa so much as in the production of more live stock, enabling the farmer to market his crop in the more compact form commanding a steadier market and greater profits, at the same time returning to the soil more of the elements of fertility.



18 FOURTEENTH ANNUAL REPORT OF RECLAMATION SERVICE.

*Live stock and equipment on irrigated farms, 1914 (17,619 farms; irrigable area, 954,187 acres).*

Item.	Number.				Value.			
	Total.	Animals per farm.	Animals per 100 acres.	Acres per animal.	Total.	Per animal.	Per farm.	Per acre.
Horses.....	62,247	3.5	7	15	\$5,811,653	\$93	\$330	\$6.10
Mules.....	3,572	0.2	0.4	257	428,875	120	24	.50
Cattle.....	108,626	6.2	11	9	5,775,219	53	328	6.10
Sheep.....	79,140	4.5	8	12	331,632	4.19	19	.30
Hogs.....	191,640	10.9	20	5	1,474,238	7.60	83	1.50
All domestic animals <sup>1</sup>	445,225	25	47	2.1	13,821,617	31	784	14.50
Fowls.....	830,946	47	87		458,056	.55	26	.50
Ostriches.....	4,432				552,525	125	31	.60
Bees (hives).....	36,962	2.1	4		169,579	4.59	10	.20
All live stock.....					\$15,002,077		851	15.80
Farm equipment.....					3,714,296		211	3.90
Total.....					18,716,373		1,062	19.70

<sup>1</sup> This term is used as defined by U. S. Census Bureau to include animals listed above.

<sup>2</sup> Includes 2 elk, \$300.

The inventory of live stock at the close of the 1914 season shows a uniform improvement in adding stock to the farms. The total value of live stock on the irrigated lands was estimated at \$15,002,077, an average of about \$850 per farm. This is an increase over the preceding year of over \$1,500,000, or about \$50 in the average per farm.

*Estimated investment in irrigated farms, 1914<sup>1</sup> (17,619 farms; irrigable area, 954,187 acres).*

Item.	Total.	Per farm.	Per acre. <sup>2</sup>
Farmers' investment:			
Purchase price of land.....	\$47,916,971	\$2,720	\$50
Cost of clearing, grading, etc.....	9,529,936	540	10
Other improvements.....	28,164,833	1,600	30
Paid toward Government water rights.....	3,069,200	180	3
Total land investment.....	\$88,797,800	5,040	93
Stock and equipment.....	18,716,373	1,062	20
Total investment.....	107,514,173	6,102	113

<sup>1</sup> Close of irrigation season.

<sup>2</sup> Per acre irrigable.

<sup>3</sup> Includes \$86,840 for "vested water rights" on one project. On other projects, where present, this value is probably represented in one of the other items.

The figures for the 17,619 farms irrigated on all projects in 1914 show that the average farm contains an irrigable area of 54 acres, of which 43 acres were watered in 1914 and 40 were harvested, a gain of 1 acre over 1913. The average crop value was \$936 per farm. The farmer's investment averaged \$6,100, of which \$1,000 represented stock and equipment and the remainder the purchase price of the land, improvements, and payments on the building or water-right charges to the Government. These figures, largely obtained directly from the irrigators, show that the average producing

farm on the projects already represents a working capital of about \$6,000, and undoubtedly in most cases the more successful farmer is employing a capital of \$8,000 or \$10,000, or even more. Of course this amount is rarely in hand in the form of cash, being gradually built up by occasional additions to the farm improvements, stock, and equipment. On the other hand, many failures are due to the lack of sufficient cash resources at the start or an attempt to use these on too large an area. Many settlers have made the mistake of investing nearly all their ready assets in the purchase of land, assuming the burden of large interest payments, and later find themselves unable to meet the other expenses incident to the development of an irrigated farm. The results may be deplorable, and it can not be too positively stated that for the man of average skill the undertaking of irrigation farming on a large project, even where the terms are the most favorable to be found, requires considerable cash resource or its equivalent. This is especially true where the newcomer buys his farm from a prior owner or entryman. Even where he enters public land at nominal charge he requires considerable cash in the first few years of development before he can count on the returns to pay expenses. This is needed for breaking and grading his fields, for improvements, equipment, and stock, as well as the living expenses not included in the above figures of capital investment.

*Summary of irrigated farms, 1914.*

Project.	Number of farms.	Irrigable acreage.		Irrigated acreage.		Cropped acreage.		Crop value.	
		Total. <sup>1</sup>	Per farm.	Total.	Per farm.	Total.	Per farm.	Total.	Per farm.
Salt River.....	3,068	194,866	63	173,030	55	169,719	55	\$4,039,079	\$1,317
Yuma.....	688	35,655	51	25,207	36	22,568	32	709,409	1,016
Orland.....	296	8,638	29	7,354	25	6,540	22	176,331	596
Uncompahgre Valley.....	910	52,338	57	33,873	37	33,091	36	870,381	956
Boise.....	1,908	120,111	59	83,590	41	74,932	37	1,333,587	655
<b>Minidoka:</b>									
Gravity unit.....	1,151	66,110	57	45,730	40	39,138	34	661,796	576
South Side pumping unit.....	562	37,900	67	35,788	64	33,512	60	558,059	993
Huntley.....	526	23,180	44	17,069	32	17,068	32	454,583	864
Milk River.....	36	5,900	161	2,201	61	2,163	60	34,613	962
Sun River.....	172	8,320	48	6,613	38	6,561	38	106,594	620
Lower Yellowstone.....	184	16,461	59	5,743	31	5,621	31	96,707	526
North Platte.....	944	74,216	79	60,532	64	59,536	63	890,202	943
Truckee-Carson.....	504	52,039	103	39,516	78	39,285	78	441,018	875
Carlsbad.....	390	15,712	40	12,690	33	10,731	28	237,663	609
Hondo.....	25	3,025	121	1,224	49	1,172	47	21,458	858
Rio Grande.....	773	30,800	40	28,442	37	27,302	35	1,190,720	1,502
North Dakota Pumping..	44	2,485	56	1,056	24	1,045	24	36,440	830
Umatilla.....	311	9,411	30	5,102	16	3,013	10	88,614	285
Klamath.....	275	24,000	106	24,440	89	24,440	89	347,344	1,263
Belle Fourche.....	615	49,426	80	37,454	61	36,709	60	461,188	750
Okanogan.....	448	8,960	20	7,740	17	3,180	7	104,576	233
<b>Yakima:</b>									
Sunnyside unit.....	2,450	66,525	27	64,052	26	49,273	20	2,858,845	1,167
Tie' on unit.....	900	22,700	25	20,600	23	15,920	18	472,480	525
Shoshone.....	429	26,599	60	22,226	52	20,905	49	313,826	732
<b>Total and average..</b>	<b>17,619</b>	<b>1,954,187</b>	<b>54</b>	<b>761,271</b>	<b>43</b>	<b>703,424</b>	<b>40</b>	<b>16,475,517</b>	<b>936</b>

<sup>1</sup> These figures cover only irrigated farms. The total therefore is less than that for the projects as a whole, given in other tables.

**OPERATIONS UNDER THE RECLAMATION EXTENSION ACT.**

In operation the reclamation extension act is amply justifying its enactment. In addition to the psychological benefits following the application of the provisions of this act the material gains and benefits are becoming increasingly pronounced.

The irrigationists, relieved from the worry of meeting pressing payments, are able to replan their operations, to the end that they are taking up in a large measure the more permanent type of agriculture—diversified farming—which insures the future of the individual farmers and of the projects and irrigation in general.

Under the former system of water-right payments it was necessary for the farmer to produce crops which would enable him to make his water-right payments irrespective of the ultimate results of such haphazard farming practices.

Because the irrigation farmers are made more secure in the retention of their land holdings, the local bankers are able to extend more liberal credit than heretofore. The leeway secured by the water users from the two sources—smaller annual payments on water rights and the additional credit available—is being utilized in two distinct ways—namely, the inauguration of live-stock raising and feeding and the improvement of farm homes and community life on the projects. These improvements are not phenomenal. It will be necessary for the water users to increase their resources still further before the needed improvements can all be well undertaken.

**GENERAL CONDITIONS OF IRRIGATION AND PRESENT PROBLEMS.**

Improvements in the operation of irrigation works and in the irrigation of lands have been marked during the past year. This is due to several causes, chief among which are the increased experience and efficiency of both operation and maintenance employees and the irrigationists. The fact that irrigation on a large scale is a highly organized business is being recognized, and this recognition is the basis for further improvement.

The attitude of the public toward irrigation as a Government undertaking is highly favorable. It is generally accepted that the investigation of possible projects, the careful construction of irrigation works, the settlement of irrigable lands, and assisting in the establishment of permanent agriculture on these lands is work that can best be undertaken by the Government. In the comparatively short time that lands under reclamation projects have been under cultivation it has been demonstrated that irrigation farming is a success and that the products of these irrigated sections compare favorably in both quantity and quality with those from the best farming communities in the humid sections of this country. It is well known that irrigation farming is more expensive and more laborious than ordinary farming, but the assurance of good returns and the stability of irrigation farming more than offset any of the disadvantages of this type of farming.

The variations in latitude and altitude affecting the several reclamation projects create a wide variety of conditions and problems, and these varying conditions and problems involve not only the methods of operation and maintenance of irrigation works, but also the intricate subjects of varied crop production and marketing of the

products. Each project has its peculiar conditions and problems, and the important work on each project is to put into effect at the earliest possible time the methods and practices in operation and maintenance, agriculture, irrigation, and marketing of products which will best serve each project.

It is also essential to determine the duty of water on the various types of soil common to each project. The provision of the reclamation extension act to the effect that operation and maintenance charges be based on the amount of irrigation water used will work inequalities among the water users if the duty of water for the different soils is not determined with reasonable accuracy in the near future. The Department of Agriculture has undertaken to determine the duty of water on several types of soil on the Minidoka project, Idaho. It is highly important that this work be inaugurated on each project where soil types vary.

#### **RURAL CREDITS—LAND-LOAN LEGISLATION.**

The people most interested in the enactment of reasonable land-loan or rural-credit legislation are the settlers in the newer sections of our country. The development of raw lands such as are now available for settlement into producing and family-supporting farm homes requires the intelligent use of considerable capital and labor. Settlers on irrigation projects in particular have need for much capital and labor and to them land-loan laws are important. Some of the States have enacted such laws, but, with possibly one exception, no provisions have been made for loaning money on lands which are indebted to the Government for water rights.

The majority of States in which reclamation projects are located have yet to enact rural-credit laws, but it is hoped that each of these States will provide ultimately for the needs of the project settlers.

Much of the requirement for cheap money on the projects is based on efforts of the farmers to take up stock raising and feeding. By the formation of live-stock associations and a combination of credits the settlers should be able to arrange the purchase of the required live stock through the associations.

#### **COOPERATIVE ORGANIZATIONS.**

The basis of cooperation among individuals is mutual understanding and mutual need. In some of the older fruit-producing sections of this country the fruit growers have combined in self-defense and effected producing and marketing associations to their great advantage. On the majority of the reclamation projects conditions have not yet reached a stage where the settlers have found it necessary to form such associations, though on many of the projects marketing of products could be helped materially by efficient associations. Due to the fact that the Government has retained control of the operation and maintenance of the project works the best foundation for cooperation among the water users has not been available. During the past year the department has inaugurated a policy of conferring with the officials of the water users' associations on subjects of vital import, and these officials and the water users as a body have shown active interest and a strong desire to share in the administration of the projects. This policy of the department has served the purpose of a schooling of the water users in the administration of the projects,

and the measure in which they have benefited from the opportunity argues well for the actual operation and maintenance of at least some of the projects by the water users. It is believed that the cooperation of the settlers in the operation and maintenance of the projects will be the basis for their cooperation in other lines of endeavor vital to their welfare.

#### **PREPARATION OF THE LAND, IRRIGATION, AND CULTIVATION.**

Variations in climatic conditions, soil types, crops, and the topography of the project lands govern to a large extent the important subjects of preparation of land and the cultivation and irrigation of crops. The methods found satisfactory on one project are not employed advantageously on any other project. The basic principles of successful agriculture may be applied on every project, but they must be supplemented in such manner as to meet the conditions peculiar to each project. Effort has been made through the office of the supervisor of irrigation to first impress upon the farmers on reclamation projects the importance of adhering to well-established principles in both the handling of soils and the handling of irrigation water, and then to work out for each project the special methods and practices best suited to meet the conditions existing.

#### **MARKETS.**

The most effective manner of establishing a market for the products of our projects is to produce that which is in demand. The community which produces crops without regard to what the public demands is sure to have trouble in disposing of the crops at good prices. Some of the projects which are favorably located are able to specialize in crop production, and where this can be done to advantage it is a wise plan. On most of the projects, however, diversified farming, which includes raising and feeding of some kinds of live stock, will be the foundation and will, in a large measure, simplify the marketing question.

#### **DRAINAGE.**

The construction of drainage works, and investigations and surveys leading to the planning of such works, were continued during the year 1914-15. On the Yuma, Boise, Minidoka, Huntley, Lower Yellowstone, North Platte, Truckee-Carson, Klamath, and Shoshone projects drainage construction has been under way. On the Carlsbad project the work of lining the main canal in order to prevent seepage of adjacent lands was carried on. On the Salt River, Uncompahgre, Sun River, Rio Grande, and Belle Fourche projects investigations have been made of areas that are seeped and water-logged. On some of these projects plans for drainage works have been partially completed.

The drains so far constructed have been generally effective in lowering the water table on the areas tributary to them and have resulted in reclaiming and protecting large areas from seepage and water-logging. On many of the areas, especially those where the ground-water table has continued high for a sufficient period to cause a deposit of alkali on the surface, the recropping of the lands after the water table is lowered requires time and a careful handling of the soils. Generally, it appears that by carefully washing out

the harmful alkali salts and the proper cultivation of the soils a stand of crops can be raised on such areas in from one to two years after drainage is completed. The longer lands are subjected to seepage and water-logged conditions the more difficult their ultimate reclamation becomes. It is of the utmost importance that careful attention be given to the handling of lands after the water table has been lowered and protection afforded against further seepage in order to bring the lands into a proper state for growing crops.

On the areas where no drainage works have been undertaken investigations show that the water table is generally rising, and that the spread of seepage and water-logging of lands are continuing. This condition shows that additional drainage works will be required in order to protect the irrigability of the lands. It is difficult on account of these changing conditions to make an accurate comparison of the total seeped areas at the present time with those of one year ago. It appears, however, that the areas that have been reclaimed and protected during the past year are in excess of those that have become seeped or threatened, or that the rate at which drainage construction has been carried on has been sufficient at least to prevent any rapid spread of seepage.

The cause of seepage, as has been stated in former reports, includes both losses from canals and laterals and excess irrigation. It has not been possible with any data so far available to determine the relative amounts of ground water contributed by these sources. In some isolated instances the losses from canals have been found sufficient to water log and render the lands immediately below them unfit for cultivation. In some cases of this kind it has been found more effective to line the waterway of the canal with concrete, and thus prevent seepage, than to attempt to drain the water out of the subsoils after it has escaped from the canal into them. This is especially true in instances where the porous subsoils extend to a greater depth than it is practicable to construct intercepting drains below the canals. In some cases the rise of ground water has been found to depend almost entirely upon the amount applied to the soil and the consequent underground waste in irrigation. Some observations have been made on the percentage of water applied to the soil that finds its way into drains. Complete data on this, however, are difficult to obtain on account of the uncertainties in determining the area tributary to a drain. In one instance where the drainage over an area was reasonably complete it was found that about 40 per cent of all the water delivered to that area, both through canal losses and by application to the soil, eventually found its way into the deep drains and was removed by them. In other instances, where less complete determinations could be made, it was found that the discharge of the drains did not much exceed 20 per cent of that applied to the soil.

The results so far obtained seem to indicate that the excess use of water in irrigation is a large and important factor in producing seepage and water-logging of lands. In general, it may be said that more water is applied to the surface at a single irrigation than the soils can retain and that a large percentage finds its way downward into the more porous subsoils and eventually must be removed. The efficiency of a drainage system depends to a great extent upon the

proper use of water in irrigation. Without this, thorough and economic drainage is difficult to accomplish.

The effect of seepage and water-logging upon lands, especially in irrigated districts where there is more or less harmful alkali, is, first, to reduce their productiveness on account of the excess waters in the soil, and, second, to render them unfit for cultivation through alkali accumulations upon the surface. As long as lands remain in this condition they are of little or no value to the owners thereof. They also reduce the total productive irrigable acreage of a project. Until such lands are reclaimed and brought into a proper condition for growing crops they are incapable of producing sufficient to pay water-right charges and the cost of operation and maintenance. They are consequently a loss to the entire community as well as to the individual owners.

It is necessary in order to protect the full irrigable areas of the various projects to continue drainage works. If these works are undertaken as soon as lands are threatened with seepage, it is possible in most cases to draw the excess water out of the soils and prevent the loss of crops thereon. If seepage is allowed to encroach upon the lands until growing crops have been destroyed, the expense of constructing drainage works is not alone increased, but in addition to this there is a loss to the settlers of the crops which could be grown and the time and effort necessary to bring the lands back to a condition of profitable cultivation.

*Estimates of seepage and summary of drainage work to June 30, 1915.*

Projects.	Drains.		Estimated area damaged by seepage.	Estimated area protected by constructed drains.	Estimated area to be protected when all drains authorized are constructed.
	Open.	Closed.			
	Miles.	Miles.	Acres.	Acres.	Acres.
Arizona-California: Yuma.....	11.5	4.0	2,000	9,250	.....
Colorado: Uncompahgre Valley.....	.....	.....	15,000	.....	.....
Idaho:					
Boise—					
Pioneer irrigation district.....	50.0	.4	8,500	20,000	( <sup>1</sup> )
Nampa-Meridian irrigation district.....	.....	.....	6,200	.....	( <sup>2</sup> )
Other parts of project.....	7.0	.1	1,300	4,000	.....
Minidoka—North side gravity.....	108.5	.....	600	36,700	36,700
Montana:					
Huntley.....	6.0	28.5	1,500	12,000	24,000
Sun River.....	.....	.....	2,300	.....	.....
Montana-North Dakota: Lower Yellowstone...	5.6	.....	1,300	1,000	.....
Nebraska-Wyoming: North Platte.....	6.0	8.6	5,000	3,200	3,700
Nevada: Truckee-Carson.....	* 178.0	3.8	8,700	.....	( <sup>3</sup> )
New Mexico:					
Carlsbad.....	1.0	3.0	2,500	1,070	5,000
Rio Grande.....	.....	.....	20,000	.....	.....
Oregon: Klamath.....	32.0	.....	5,500	10,000	21,000
South Dakota: Belle Fourche.....	.....	.....	2,500	.....	.....
Wyoming: Shoshone.....	7.9	39.0	1,050	11,500	21,000
Total.....	413.5	87.4	78,950	109,320	.....

<sup>1</sup> Supplemental contract voted by Pioneer irrigation district. The work proposed under this contract is estimated will protect about 10,000 acres.

<sup>2</sup> Drainage contract voted by Nampa-Meridian district but not yet approved by the courts. The work proposed under this contract will protect perhaps 50,000 acres.

<sup>3</sup> Practically all of these are shallow drains which carry surface waste, but not deep enough to protect lands from seepage. Impossible to estimate area protected.

\* It is estimated that 40,000 acres can be protected by the construction of 80 miles of open drains. This has been disapproved by the water users.

**LEGAL DIVISION.**

The legal work of the Reclamation Service is under the jurisdiction of the chief counsel, who is in charge of the legal division. This division includes the law section and the land and general section of the Washington office, and nine district counsel offices in the field, the total force, exclusive of stenographers, numbering 25.

During the calendar year 1914 there were 68 lawsuits affecting the service, pending or settled. The total amount involved in these cases, where the amount was determinable from the proceedings, was over \$3,600,000, while the real amount involved in other cases totaled several million dollars. The district counsel were chiefly responsible for the handling of these cases, but each received careful consideration by the chief counsel and his attorneys in the Washington office. Over 3,400 contracts were executed during 1914, involving \$10,-500,000.

The work of the legal division covers a wide range of topics, and includes the acquisition of water rights for Government projects, securing rights of way for canals and other works, the purchase of land, examination of abstracts of title, the preparation of public notices and laws and regulations, the interpretation of laws and rules, questions involving public land entries on reclamation projects, and many other subjects.

The advice of the district counsel on the various projects is constantly sought by members of the project manager's office and by the water users on countless subjects that arise from day to day.

Most of the general correspondence of the Washington office is handled by the legal division. The work of the legal division is for the most part of such a nature that it can not be tabulated nor expressed in figures, and of course an adequate record of the number of lawsuits avoided through the activity of the members of this division is impracticable.

During the sessions of the several legislatures of the reclamation States in the early part of the year 1915 the chief counsel and his assistants, especially those in the field, spent much time cooperating in the efforts being made to improve the State irrigation district laws with special reference toward providing for closer relations with the Federal Government in extending irrigation development. Legislation of this kind was passed in most of the irrigation States.

The chief counsel is the legal adviser of the Secretary of the Interior upon reclamation matters and the legal division is concerned in the interests of water users as well as the interests of the Government.



**CONTRACTS UNDER WARREN ACT.**

[Feb. 21, 1911, 36 Stat., 825.]

**NORTH PLATTE PROJECT, NEBRASKA-WYOMING.****PERMANENT WATER SUPPLY.**

Name.	Date.	Amount of water in acre-feet.	Amount per acre-foot.	Total amount.	Annual operation and maintenance charge. <sup>1</sup>
Tri-State Land Co. (succeeded by Farmers' Irrigation District.)	Aug. 20, 1912 Nov. 20, 1912 Dec. 6, 1912	100,000	\$5.00	\$500,000.00	†
Gering Irrigation District.....	Aug. 31, 1915 Jan. 17, 1913	20,000	5.00	100,000.00	††
Central Irrigation District.....	Aug. 4, 1914 Mar. 6, 1913	2,455	5.00	12,275.00	††
Chimney Rock Irrigation Canal & Water Power Co.	Aug. 4, 1914 Mar. 6, 1913	6,580	5.00	32,900.00	††
Beerline Irrigation Canal Co.....	Aug. 6, 1914 Mar. 6, 1913	2,050	5.00	10,250.00	†††
Browns Creek Irrigation District.....	July 14, 1913 Aug. 4, 1914	12,380	5.00	61,900.00	††
Bridgeport Irrigation District.....	June 14, 1915	15,524	5.00	77,620.00	††
Pleasant Valley Lateral Association.....	June 16, 1915	6,573.6	5.00	32,838.00	††
Goshen Land Co.....	July 1, 1915	18,652	5.00	93,260.00	††

**TEMPORARY WATER SUPPLY.**

Winters Creek Canal Co.....	July 15, 1914	1,300	\$0.30	\$390.00	.....
Goshen Land Co.....	do.	5,030	.30	1,509.00	.....
Blue Creek Irrigation District.....	July 18, 1914	1,480	.30	444.00	.....
Meeker Ditch Co.....	do.	1,100	.30	330.00	.....
Iowa Irrigation & Improvement Co.....	do.	600	.30	180.00	.....
Alliance Irrigation Canal & Water Power Co.....	do.	985	.30	295.50	.....
Pleasant Valley Lateral Association.....	do.	2,920	.30	888.00	.....
Enterprise Irrigation District.....	do.	3,030	.30	909.00	.....
Paisley Irrigation Ditch Co.....	July 20, 1914	800	.30	240.00	.....

**BOISE PROJECT, IDAHO.****TEMPORARY WATER SUPPLY.**

Farmers' Cooperative Ditch Co.....	Aug. 10, 1915	1,200	\$0.60	\$720.00	.....
Farmers' Union Ditch Co.....	July 23, 1915	2,500	.60	1,500.00	.....
Gallaher, Josephine E.....	Aug. 16, 1915	20	.60	12.00	.....
Nampa & Meridian Irrigation District.....	Aug. 12, 1915	4,300	.60	2,580.00	.....
New York Canal Co. (Ltd.).....	July 23, 1915	3,500	.60	2,100.00	.....
Supplemental.....	Aug. 11, 1915	5,600	.60	3,360.00	.....
Pioneer Irrigation District.....	July 27, 1915	5,000	.60	3,000.00	.....
Riverside Irrigation District.....	July 28, 1915	500	.60	300.00	.....
Supplemental.....	Aug. 17, 1915	1,500	.60	900.00	.....
Settlers' Irrigation District.....	July 27, 1915	1,800	.60	1,080.00	.....
South Boise Mutual Irrigation District.....	Aug. 12, 1915	220	.60	174.00	.....

**MINIDOKA PROJECT, IDAHO—JACKSON LAKE ENLARGEMENT.****PERMANENT WATER SUPPLY.<sup>2</sup>**

Kuhn Irrigation & Canal Co.....	Feb. 25, 1913	305,000	\$2.12	\$648,125.00	.....
Twin Falls Canal Co.....	do.	95,000	2.12	201,875.00	.....

**TEMPORARY WATER SUPPLY.<sup>2</sup>**

Kuhn Irrigation & Canal Co. and Twin Falls North Side Land & Water Co.....	Apr. 20, 1915	103,000	\$0.15	\$16,350	.....
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<sup>1</sup> Proportion of operation and maintenance cost of storage reservoirs.<sup>2</sup> The quantities and costs in these cases are estimated. The actual costs are to be paid.

*Contracts under Warren Act—Continued.*

## YAKIMA PROJECT, WASHINGTON.

## PERMANENT WATER SUPPLY.

Name.	Date.	Amount of water in acre-feet.	Amount per acre-foot.	Total amount.	Annual operation and maintenance charge.
Kittitas Reclamation District <sup>1</sup> .....	Jan. 18, 1913	210,000	\$4.20	\$882,000.00	\$10,500.00
Sunnyside Irrigation District <sup>1</sup> .....	Oct. 6, 1914	18,820	13.00	240,760.00	633.00
Snipes Mountain Irrigation District <sup>1</sup> .....	Nov. 16, 1914	5,265	18.90	99,580.00	287.25
Outlook Irrigation District <sup>2</sup> .....	Nov. 23, 1914	11,630	18.90	219,700.00	633.75
Union Gap Irrigation District.....	Mar. 3, 1915	4,222	4.50	19,000.00	225.00

## YUMA PROJECT, ARIZONA.

## TEMPORARY WATER SUPPLY.

Yuma Mesa Irrigation Co.....	July 21, 1915	1,600	\$0.50	\$800.00	.....
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## KLAMATH PROJECT, OREGON-CALIFORNIA.

## TEMPORARY WATER SUPPLY.

Van Brimmer Ditch Co.....	July 16, 1915	5,000	\$0.25	\$1,250.00	.....
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<sup>1</sup> No construction has been undertaken, as the district has not been able to sell its bonds.

<sup>2</sup> These districts contracted for water supply and carriage to their respective district boundaries at a uniform charge of \$52 per acre, which is the same as the building charge on the project, and in addition the cost of the power plant should be added, included in total amount.

## LITIGATION.

The record shows that a large number of cases have been disposed of and that the number of new cases is not so great as those disposed of, making a net decrease in the number of cases pending:

Number of cases pending at the beginning of the year.....	52
Number of cases initiated during the year.....	22
Total.....	<sup>1</sup> 74
Number of cases disposed of during the year.....	23
Number of cases pending at the end of the year.....	46

## LEGISLATION.

During the fiscal year Congress enacted what is known as the reclamation extension act, which became a law on August 13, 1914 (38 Stat., 686). More than three-fourths of the water users who were subject to prior acts have taken advantage of the provisions of this act, which extends the period of payment so as to provide 20 years for paying the construction charge and permits payments to be made in much smaller annual installments.

October 5, 1914 (38 Stat., 727), Congress passed an act to authorize the reservation of tracts within the several projects for country parks, public playgrounds, and community centers, for the use of the residents and landowners on the projects.

By the act of March 4, 1915 (38 Stat., 1215), provision was made for exchange of any land within a homestead entry on a project

<sup>1</sup> Total amount involved (approximate), \$6,000,000.

which has been taken as susceptible of irrigation and afterwards found not irrigable.

In the sundry civil appropriation act of March 3, 1915 (38 Stat., 822-859), the first annual appropriation for the Reclamation Service was made. This act was passed in pursuance of the provisions of section 16 of the reclamation extension act.

Copies of these acts will be found in the appendix.

#### **DECISIONS OF THE SECRETARY OF THE INTERIOR.**

The substance of important decisions which have been rendered by the Secretary of the Interior during the fiscal year will be found in the appendix. Among them are a few important decisions by the Comptroller of the Treasury.

#### **PUBLIC NOTICES AND ORDERS.**

Copies of the public notices and orders issued by the Secretary in regard to reclamation payments, etc., during the fiscal year will be found in the appendix.

#### **PURCHASES OF RIGHTS AND PROPERTY.**

A statement of the transactions for the acquisition of rights and property is given in the appendix.

#### **POWER DEVELOPMENT.**

In connection with the construction of irrigation work, particularly of dams on the larger rivers, it has been found necessary to develop more or less power. Power plants erected under these conditions are operated principally for pumping water for irrigation and incidentally for other purposes, the excess power being sold for domestic or industrial uses, such as lighting, heating, cooking, and operation of machinery. The accompanying tables show the power and pumping plants installed on the projects and the results of operation for the calendar year 1914. Pumping forms the principal use of the electric-power development, and there are installed 10,432 horsepower in permanent pumping plants used in 1914, in addition to numerous small drainage installations semiportable and intermittently used. From the tables it will be noted that the cost of raising 1 acre-foot 1 foot ranges from 0.368 cent to 2.10 cents.

Power plants operated by United States Reclamation Service in calendar year 1914.

Project.	Name of plant.	Type.	Capacity.	Number of units.	Head.	First cost of plant.	Output.	Cost per kilowatt-hour.	Distribution of power generated (kilowatt-hours).						Gross income from power sales.	Inter- ruptions to serv- ice.
									Sold to cus- tomers.	Used for irrigation pumping.	Used for construction.	Used for camp lights.	Used for drainage work.	Losses.		
Salt River.....	Roosevelt.....	Hydro-electric.	Kilowatts. 5,500	5	Feet. 228	\$849,585.62	13,346,100	Cents. 0.644	14,654,199	3,313,738	35,232	58,699	.....	2,526,272	\$179,456.58	91
Do.....	South Consolidated.	do.....	2,000	2	33	\$162,123.05	3,778,000	.....	.....	.....	.....	.....	.....	.....	.....	.....
Do.....	Arizona Falls.	do.....	1,060	2	21	\$109,500.73	2,942,040	.....	.....	.....	.....	.....	.....	.....	.....	.....
Do.....	Crescent.	do.....	4,200	6	117	\$63,738.78	522,000	.....	.....	.....	.....	.....	.....	.....	.....	.....
Minidoka.....	Minidoka.	do.....	7,000	5	46	\$470,085.44	80,410,911	.111	7,508,426	17,560,548	.....	1,083,865	1,670,059	2,578,013	20,344.50	37
Poise.....	Poise.	do.....	1,875	3	27	\$107,995.37	7,818,964	.295	2,152,832	.....	.....	4,707,814	.....	938,348	17,063.36	14
Truckee-Carson.	Lahontan.	do.....	1,250	2	112	\$5,317.38	907,060	1.61	237,158	11,811	.....	\$658,081	.....	.....	4,662.70	45
Strawberry Valley.	Spanish Fork.	do.....	850	2	123	\$68,812.15	798,914	2.74	710,015	.....	.....	77,775	.....	11,124	7,226.23	52
Oregon.	Plant No. 11.	do.....	187	1	105	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Do.....	Plant No. 21.	do.....	187	1	56	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Rio Grande.....	Elephant Butte.	Steam-electric.	1,875	3	.....	\$36,491.83	4,552,880	2.68	20,354	.....	4,509,020	23,476	.....	.....	978.11	.....
North Dakota Pumping.	Williston.....	do.....	1,150	5	.....	228,690.39	1,122,735	3.82	461,700	378,851	.....	\$249,119	.....	33,065	19,421.75	1
Total.....	.....	.....	27,134	37	.....	\$2,542,159.74	66,199,624	.....	25,744,714	21,264,948	9,910,147	1,502,934	2,628,407	5,148,474	249,174.23	240

1 Not entirely completed.

2 Does not include \$1,419,080.56 cost of power canal and diversion dam.

3 Approximate cost; includes operators' quarters.

4 Includes operators' quarters.

5 Also energy used for camp lights and line losses.

6 Also energy used for auxiliaries.

NOTE.—Cost per kilowatt-hour includes cost of operating power plants and transmission lines, also depreciation to the extent of 4 per cent to 5 per cent of the cost of plant.

*Pumping plants operated by United States Reclamation Service in calendar year 1914.*

Project.	Name of plant.	Type. <sup>1</sup>	Capacity of prime mover in horse-power.	Number of units.	Head pumped against.	First cost of plant.	Kilowatt-hours used for pumping.	Acres-foot pumped.	Cost per foot-acre foot.
					<i>Feet.</i>				<i>Cents.</i>
Salt River...	Battery A...	V. M. D. C...	75	1	49	\$16,510.03		2,294	
Do.....	Battery B.....	do.....	75	1	46.25	20,788.83		3,606	
Do.....	Battery C.....	do.....	75	1	48.39	16,788.12		3,900	
Do.....	Battery D.....	do.....	75	1	46.7	19,345.46		4,070	
Do.....	Battery E.....	do.....	75	1	48.39	21,898.29		3,066	
Do.....	Battery F.....	do.....	75	1	32	17,306.41		4,603	
Do.....	Clemens wells.	H. M. D. C...	100	1	31.28	7,492.30	8,313,738	4,888	2.10
Do.....	San Francisco.	do.....	100	1	30	28,975.94		1,632	
Do.....	McQueen well.	V. M. D. C...	75	1	47.95	16,258.72		2,177	
Do.....	High line....	H. M. D. C...	450	3	43	27,288.70		14,551	
Minkloka....	First lift....	V. M. D. C...	2,760	4	30.13	178,166.49		144,772	
Do.....	Second lift..	do.....	2,400	4	31.95	168,851.13		122,906	
Do.....	Third lift....	do.....	1,560	3	30.09	98,307.66	17,560,548	70,297	.368
Do.....	West end....	H. M. D. C...	150	2	18	16,533.43		4,286	
Do.....	1812 raise....	do.....	5	1	4	7,014.43		29	
Do.....	A 4 raise....	Scoop wheel.	15	1	4	3,191.22		795	
North Dakota Pumping.	Substation A	H. M. D. C...	175	2	27.4	12,550.26		735	
Do.....	Substation B	do.....	100	1	27.4	7,386.45	378,851	415	1.6
Do.....	Barge.....	do.....	540	4	30	34,712.09		2,644	
Do.....	Substation D	S. T. D. C...	40	1	21.6	(Part of steam plant.		1,835	
Do.....	Substation E	do.....	450	2	50.7				
Huntley....	Ballantine pumping station.	V. T. D. C...	572	2	43.2	71,522.30	Water-power plant.	6,994	.531
Okanogan...	Robinson Flat pumping plant. <sup>2</sup>	H. M. D. C...	400	2	188				
Yuma.....	Drainage pump. <sup>4</sup>	G. E. D. C...	130	2	10.5				
Total.....			10,472	43		784,788.56	21,253,137	400,484	

<sup>1</sup> Type V. M. D. C.—vertical motor-driven centrifugal pump; type H. M. D. C.—horizontal motor-driven centrifugal pump; type S. T. D. C.—steam-turbine driven centrifugal pump; type G. E. D. C.—gas-engine driven centrifugal pump; type V. T. D. C.—vertical hydraulic turbine-driven centrifugal pump.

<sup>2</sup> Covers only reequipment of pumping apparatus.

<sup>3</sup> Not entirely complete.

<sup>4</sup> Only operated short time.

The accompanying table gives in concise form and in alphabetic order, by States, the power remaining undeveloped on the different projects:

*Water power undeveloped.*

Project.	Name of plant.	Lead.	Horse power.
		<i>Feet.</i>	
Arizona-California, Yuma.....	Drop, California Canal.....	9	1,000
Do.....	Araz.....	25	7,700
California, Orland.....	.....	27	483
Colorado, Grand Valley.....	Main Canal.....	44	3,600
Colorado, Uncompahgre.....	.....	.....	10,000
Idaho, Boise.....	Arrowrock Dam.....	63-180	17,000
Do.....	Drops in canals.....	20-90	4,800
Idaho-Minkdoka.....	Minkdoka Dam.....	46	10,000
Montana, Flathead (Indian).....	Flathead River.....	60	360,000
Do.....	Revels Creek.....	1,000	23,000
Montana, Huntley.....	Main Canal drop.....	34	314
Montana-North Dakota, Lower Yellowstone.....	Lateral KK drop.....	.....	290
Nevada, Truckee-Carson.....	Lahontan.....	120	5,000
Do.....	26-foot drop.....	26	2,000
New Mexico-Texas, Rio Grande.....	Elephant Butte Dam.....	60-190	12,000
Oregon-California, Klamath.....	Various sites.....	22-88	9,700
Oregon, Umatilla.....	Drainage outfall.....	28	145
Utah, Strawberry Valley.....	Spanish Fork.....	125	1,900
Washington, Okanogan.....	Salmon Creek.....	441	2,800
Washington, Yakima, Sunnyside Unit.....	Drops in canals.....	20-88	1,800
Washington, Yakima, Tieton Unit.....	.....	.....	3,250
Washington, Wapato.....	.....	.....	9,000
Total.....	.....	.....	488,782

The accompanying table shows the power contracts in force on June 30, 1915, on the various projects:

*Contracts for sale of power, fiscal year 1914-15.*

Project and name of contractor.	Date of contract.	Date of expiration.	Limit of load.	Rate per kilowatt hour.	Gross income fiscal year 1915.	Remarks.
<b>SALT RIVER.</b>						
Salt River Valley Water Users' Association.	May 11, 1907	Perpetual....	<i>Kilowatts.</i> 750	Cost.....	\$1,017.92	For Sacaton Indians.
Pacific Gas & Electric Co.	June 22, 1907	Sept. 30, 1919	1,500	1.5 cents....	92,637.62	
Arizona Alfalfa Mill Co.	Mar. 6, 1913	Mar. 6, 1916	200	.....do.....	2,250.00	
Roosevelt Mercantile Co.	Mar. 1, 1911	Mar. 1, 1916	None.	5 cents.....	134.15	
S. D. Lount & Sons.	Apr. 20, 1914	Renewed 1 year. May 21, 1919	200	4 to 1.33 cents.	4,329.00	Option on 800 kilowatts additional any time within 10 years.
Town of Glendale	Feb. 6, 1914	Mar. 16, 1919	200	5 to 1.67 cents.	2,897.86	
Arizona Portland Cement Co.	Feb. 28, 1913	Mar. 28, 1923	400	3.25 to 1.08 cents.	22,320.00	
Consolidated Canal Co.	Dec. 23, 1912	Perpetual....	300	1 cent.....	6,552.00	
Inspiration Consolidated Copper Co.	July 15, 1912	Aug. 2, 1922	8,000	0.75 cent....	85,784.06	
Southwestern Sugar & Land Co.	Nov. 29, 1911	Jan. 12, 1915	600	1.5 cents....	3,024.28	Part of consideration McQueen well.
Western Sugar & Land Co.	Mar. 20, 1915	Apr. 28, 1916	155	3.5 to 1.17 cents.	1,961.56	
A. C. McQueen and Lottie McQueen.	July 31, 1911	May 1, 1924	100 kilowatt hour per month.	None.....	None.	
Falls Power & Electric Co.	Oct. 8, 1914	Jan. 16, 1925	150	2 to 1.25 cents.	None.	

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*Contracts for sale of power, fiscal year 1914-15—Continued.*

Project and name of contractor.	Date of contract.	Date of expiration.	Limit of load.	Rate per kilowatt-hour.	Gross income fiscal year 1915.	Remarks.
<b>BOISE.</b>						
Electric Investment Co.	Apr. 1, 1915	Oct. 15, 1915	<i>Kilowatts.</i> All surplus power.	1 and 0.75 cent.	\$10,170.14	
<b>MINIDOKA.</b>						
Ernest B. Skinner	Mar. 9, 1910	Mar. 9, 1920	300-1,500	2.7 to 0.5 cents.	1,493.05	Minimum, \$1,500 per calendar year.
Rupert Electric Co.	Mar. 16, 1910	Mar. 16, 1920	300-1,500	.....do.....	7,478.81	Do.
Village of Burley.	Apr. 21, 1910	Apr. 21, 1920	300-1,500	.....do.....	7,526.99	Do.
Amalgamated Sugar Co.	Oct. 16, 1912	Dec. 21, 1922	5-170	Minidoka standard.	2,836.32	
Ralph E. Scoville.	Jan. 19, 1913	Mar. 8, 1918	5	.....do.....	66.76	
Minidoka North Side Power Co.	Apr. 1, 1913	Sept. 2, 1923	5	.....do.....	225.43	
Portland Feeder Co.	Sept. 13, 1913	Feb. 11, 1917	42	.....do.....	930.27	
Noah C. Lowry.	Nov. 23, 1913	Dec. 23, 1923	5½	.....do.....	38.47	
Paul Electric Co.	Jan. 20, 1914	Feb. 13, 1924	5-10	.....do.....	202.38	
Farmers' Electric Co.	June 1, 1914	June 20, 1924	2	.....do.....	106.59	
Lee St. Clair.	Sept. 3, 1914	Oct. 1, 1915	.5	.....do.....	13.53	
Harvey Moncur.	Sept. 16, 1914	Oct. 9, 1924	1	.....do.....	15.36	
Wesley O. Croy.	Sept. 17, 1914	Apr. 9, 1915	1	.....do.....	14.67	
J. R. Cattell.	Sept. 25, 1914	Oct. 12, 1924	1	.....do.....	15.18	
Ernest J. Hansen.	Oct. 11, 1914	Jan. 13, 1925	.5	.....do.....	8.39	
Irl G. Clayville.	Oct. 21, 1914	Jan. 2, 1925	1	.....do.....	15.18	
Mathis Christen.	.....do.....	.....do.....	1	.....do.....	15.18	
W. A. Drew.	.....do.....	.....do.....	1	.....do.....	23.99	
James H. Lewis.	.....do.....	Feb. 9, 1925	1	.....do.....	18.26	
W. T. McCord.	.....do.....	Jan. 2, 1918	1	.....do.....	15.22	
John D. Hunsinger.	.....do.....	Jan. 2, 1925	1	.....do.....	29.73	
E. T. Hollenbeck.	.....do.....	.....do.....	1	.....do.....	16.45	
Thomas B. Anderson.	.....do.....	.....do.....	1-2	.....do.....	27.57	
A. F. Ames.	.....do.....	.....do.....	1	.....do.....	15.18	
Schodde Electric Co.	May 24, 1915	June 28, 1925	5-7	.....do.....		Contract starts Aug. 1, 1915.
<b>TRUCKEE-CARSON.</b>						
Canyon Power Co.	Dec. 1, 1914	Dec. 1, 1924	Capacity of plant.	0.25 and 0.375 cents.	4,473.33	Lease of power plant; summer minimum, \$1,200 per month.
City of Fallon.	July 1, 1914	Nov. 37, 1914	200	1 cent.	2,058.22	Taken over by Canyon Power Co. with lease. Minimum, \$250 per month.
Thos. Dolf.	Nov. 1, 1914	June 30, 1915		5 cents.	24.60	Minimum, \$300 per month.
W. A. Harmon.	.....do.....	.....do.....		.....do.....	26.50	Do.
<b>NORTH DAKOTA PUMPING.</b>						
City of Williston.	Oct. 16, 1912	Oct. 16, 1922	300-600	4.5 to 2 cents.	21,309.00	
<b>STRAWBERRY VALLEY.</b>						
Spanish Fork City.	Oct. 9, 1912	Oct. 9, 1915	400	0.8 cent.	2,787.16	Minimum, \$250 per month.
Payson City.	July 27, 1914	Sept. 30, 1917	100	1 cent.	3,918.00	Minimum, \$150 per month.
Town of Salem.	Jan. 19, 1915	Jan. 19, 1918	50	1.5 cents.	720.15	Minimum, \$60 per month.
John B. Jex.	Mar. 20, 1915	Mar. 20, 1916	5	9 cents.	46.17	Minimum, \$3 per month.

<sup>1</sup> Total gross income fiscal year 1915, \$280,593.67.

*Minidoka standard contract rates for electric light and power.*

	Per kilowatt-hour.
First 50 hours' use of maximum demand.....	\$0.04
Next 50 hours' use of maximum demand.....	.03
Next 50 hours' use of maximum demand.....	.02
Next 150 hours' use of maximum demand.....	.01
Balance hours' use of maximum demand.....	.005

Above rates increase 25 per cent during June, July, and August.  
Above rates subject to following discounts:

For a maximum demand of—	Per cent.
2 kilowatts and less than 4 kilowatts.....	2
4 kilowatts and less than 7 kilowatts.....	4
7 kilowatts and less than 11 kilowatts.....	6
11 kilowatts and less than 15 kilowatts.....	8
15 kilowatts and less than 19 kilowatts.....	10
19 kilowatts and less than 24 kilowatts.....	12
24 kilowatts and less than 29 kilowatts.....	14
29 kilowatts and less than 35 kilowatts.....	16
35 kilowatts and less than 41 kilowatts.....	18
41 kilowatts and less than 48 kilowatts.....	20
48 kilowatts and less than 57 kilowatts.....	22
57 kilowatts and less than 67 kilowatts.....	24
67 kilowatts and less than 80 kilowatts.....	26
80 kilowatts and less than 100 kilowatts.....	28
100 and over.....	30

Minimum payment shall not be less than \$1.80 per month per kilowatt of the contractor's agreed maximum demand. All above rates subject to 10 per cent discount if energy is delivered and metered at approximately 2,200 or more volts or 8 per cent if delivered at approximately 2,200 or more volts and metered at a lower voltage.

## ELECTRICAL AND MECHANICAL ENGINEERING.

The following is a general report of the work carried on by the office of the chief electrical engineer during the year ending June 30, 1915.

*Arizona, Salt River project.*—The 4,200-kilowatt 6-unit Crosscut hydroelectric plant was started for the first time on October 30. This plant is unique, in that it is a vertical impulse wheel plant designed for 117-foot head, with reinforced concrete water passages. Two concrete force mains carry the water from fore bay to water wheels. The machines are very low speed, 94 revolutions per minute, and generate 25-cycle current at 11,000 volts. The plant acts not only as a generating station, but also as a switching station, the control of all circuits being handled from a bench board. The arrangement of the plant is such that one man and a helper easily handle the operation. In the design of the plant many original problems were encountered and met by special design. Some difficulties have been encountered, but changes are now being made which promise not only to overcome these difficulties, but to increase materially the output and efficiency of the wheels over the contractor's guaranties. The contract for the hydraulic machinery contains a guarantee of 75 per cent as the wheel efficiency. There is also a bonus and deduction clause of \$1,200 for each per cent variation from the above.



The McQueen well pumping installation was completed during December, 1914. This plant consists of a 10-second-foot, vertical centrifugal pump, direct-connected to a 75-horsepower vertical motor, and is automatically controlled, requiring only an occasional visit from an operator.

Specifications were issued and contracts awarded covering the purchase of a 4,000-kilowatt vertical generating unit for installation in the Roosevelt power plant. This apparatus has all arrived on the project, but hauling and installation were delayed by rains and the overflow from the spillways at the dam. The working drawings were completed and all material purchased for this installation.

The protection of the sluicing gates and tunnel at the Roosevelt Dam was studied, and, pursuant to the recommendations of a board of engineers, two bronze sliding gates were designed and purchased. Two regulating needle valves were also designed and purchased for this work.

*Arizona-California, Yuma project.*—A drainage pumping plant, consisting of two 25-second-foot pumps for a head of 10 feet, was installed on the levee of the Indian reservation at Yuma, to pump drainage water at a high stage of the river. These pumps are driven by 6-cylinder automobile engines, specially fitted for burning low-grade fuels.

*Idaho, Boise project.*—The inspection and testing work in connection with the 20 balanced valves for the Arrowrock Dam was closely followed by the chief electrical engineer's office. All of these valves were delivered and 18 installed at the close of the fiscal year. The two remaining valves will not be installed until the water in the reservoir is considerably lowered. Ample opportunity has been afforded to test the valves and their operation has been very gratifying.

Assistance was given in the matter of the sale of surplus power from the Boise plant. A number of estimates were made for power and pumping plants on and near the project.

*Idaho, Minidoka project.*—The problem of increasing the capacity of the pumps at the South Side pumping plants, by redesigning the pump impellers, but making no change in the driving equipment, was worked out to completion. The results obtained from the new impellers installed in 1913-14 were so gratifying that it was decided to change the impellers in the remaining pumps. Six large and two small impellers from designs made in the office of the chief electrical engineer were purchased and installed. These new impellers have increased the capacity of the first-lift pumping station from 665 second-feet to 760 second-feet; the second lift from 550 second-feet to 660 second-feet; and the third lift from 325 second-feet to 430 second-feet. Including the work done in 1913-14, the aggregate capacity of the three stations will thus be increased from 1,400 second-feet to 1,850 second-feet at an approximate cost of \$18,000.

A scoop wheel was designed, purchased, and installed at the A-4 raise to lift 20 second-feet of water  $3\frac{1}{2}$  feet. This wheel was placed in operation and a test showed the remarkable efficiency of 70 per cent, which included the reduction gears. Another scoop wheel was designed and placed in operation for the 1,817 raise. The requirements are to raise 10 second-feet 4.8 feet.

Rock excavation in the tailrace below the plant was completed the latter part of November, 1914, increasing the head on the plant by about 1 foot by allowing a free outflow for the tailwater. This added approximately 200 kilowatts to the capacity of the plant.

The design and construction of the Boersch Lake drainage pumping plant was nearly completed. This plant consists of two 25-second-foot vertical pumps to operate against a head of 21 feet. The pumps are directly connected to 75-horsepower induction motors controlled by an automatic switchboard. The purchase of practically all equipment and material was completed during the fiscal year.

The designs were made for an outdoor substation to deliver power to the town of Acequia and to the 114-raise pumping plant.

*Montana, Milk River project, St. Mary storage unit.*—Some time was spent in the study of designs for the Sherburne Lakes Reservoir outlets. Specifications were issued and contract made for furnishing and erecting steel pressure pipes for the St. Mary Crossing and Hall's Coulee Crossing.

*Montana, Sun River project.*—The excavation work on the canals and tunnels was carried on mostly by electric power purchased from the Great Falls Power Co. under contract.

*Power purchased from Great Falls Power Co.*

Month.	Kilowatt-hours purchased by United States.	Amount of bill.	Deduction for interruption.	Interruptions.
1914.				
January.....	\$19,500	\$297.20		
February.....	14,700	239.06		8
March.....	22,850	373.88	\$32.00	2
April.....	41,255	570.13		
May.....	49,815	577.74	80.00	2
June.....	61,900	708.59		
July.....	76,300	822.43		
August.....	90,845	1,000.15		
September.....	91,185	998.23		
October.....	80,410	904.50	40.00	1
November.....	103,290	1,121.07		
December.....	57,900	815.19	28.00	1
Total.....	709,950	8,425.07	180.00	14

*Nebraska-Wyoming, North Platte project.*—The chief electrical engineer attended a board meeting at Salt Lake City on December 19, 1914, to consider the protection of the outlet tunnels below the balanced valves at the Pathfinder Dam. Pursuant to the recommendations of this board, boiler-plate linings were designed, purchased, and installed.

*Nevada, Truckee-Carson project.*—A lease of the Lahontan power plant to the Canyon Power Co., effective December 1, 1914, was consummated. A representative from this office made an inspection and test of the plant December 1 in connection with lessees to determine the condition of the plant and apparatus. In order to take care of the charging current and furnish power to the Canyon Power Co.'s transmission line to Lovelock, it was necessary to install a third generating unit in the plant. This construction work was carried out by the lessee under plans and specifications furnished by the chief

electrical engineer, and was completed before the close of the fiscal year. The capacity of the plant has been increased from 1,250 to a total of 1,875 kilowatts by these changes.

*New Mexico-Texas, Rio Grande project, Elephant Butte Dam.*—Specifications for hydraulic and electrical apparatus for a small power plant at Elephant Butte Dam were prepared and purchase of equipment completed. At the end of the fiscal year practically all of the apparatus was on the ground and nearly all material necessary for the construction of the plant had been purchased.

*North Dakota, North Dakota Pumping project.*—The new 2,200-volt circuit to Williston was placed in operation. This arrangement allows the barge to be operated on the 22,000-volt line at night and the city of Williston on the 2,200-volt line, thus giving the latter a far better regulation. During the daytime, however, the barge was operated on the 2,200-volt circuit, in order to avoid the loss in the transforming equipment.

*Oregon, Columbia River Power project.*—The chief electrical engineer served as a member of a board of engineers to consider the feasibility of the power project at The Dalles, Oreg.

*Washington, Okanogan project.*—The design and construction of the power and pumping system on the Okanogan project was nearly completed during the fiscal year. This system comprises two power plants, each containing a single 187-kilowatt 6,600-volt generator, 5 miles of 6,600-volt transmission line, and a pumping plant with two 6 second-feet two-stage pumps. The power plant at drop No. 1 operates under a head of 105 feet and the plant at drop No. 2 under a head of 56 feet. The pumping plant draws its supply from the Okanogan River and delivers into the canal supplying Robinson Flat, a pumping lift of 188 feet. Each pump is direct driven by a 200-horsepower induction motor, and the plant is controlled by an automatic switchboard. The plant will be used to supplement the water supply during dry years only, and will, therefore, not be operated regularly every season.

*Washington, Yakima project, Sunnyside unit.*—Plans for the pumping plant in the south branch of the Snipes Mountain canal were developed and the machinery purchased and installed. This plant covers the high land on Snipes Mountain comprising the Snipes Mountain irrigation district and contains two vertical units with capacities of 10 and 4 second-feet, respectively. Each unit consists of a hydraulic turbine and a centrifugal pump combined in a single casing and receiving water from the same penstock. The power head is 63 feet and the pumps add to this a head of 200 feet. Both penstock and delivery pipe are of wood-stave construction.

A similar unit having a pump capacity of 1.5 second-feet was purchased and installed to take the place of the hydraulic rams which have supplied the Hillcrest portion of the Snipes Mountain irrigation district. This unit will operate under a power head of 32 feet and will produce an additional head of 113 feet.

A small geared pumping unit to supply a small isolated area in this irrigation district was also purchased and installed.

The pumping plant for the Outlook irrigation district was designed and machinery purchased. The building was nearly completed, but the machinery had not been delivered at the close of the fiscal year. This plant is very similar to the Snipes Mountain plant in general

design. The units have pump capacities of 35 and 15 second-feet, respectively. The power head is 45 feet and the pumping head is 109 feet. The penstocks are of reinforced concrete and the delivery pipe is of wood staves.

*Wyoming, Shoshone project.*—Two 58-inch balanced valves for the Shoshone Dam were purchased and inspected. A steel bulkhead for closing the outlet tunnel in connection with this valve installation was designed and purchased. A small turbine-driven combination pump and generator unit was also purchased to furnish lights for the dam and water under pressure for operating the balanced valves.

### CEMENT-TESTING WORK.

The amount of cement for which tests were made during the fiscal year ending June 30, 1915, was 602,288 barrels, of which 583,588 barrels were accepted and 18,700 rejected. The following table shows the number of barrels for which tests have been made, and the amount and per cent accepted, from 1904, when the testing laboratory was opened, to June 30, 1915.

*Cement tested.*

Year.	Amount for which tests were made.	Accepted.	
		Amount.	Per cent.
Jan. 1, 1904, to June 30, 1906.....	<i>Barrels.</i> 160,044	<i>Barrels.</i> 146,602	91.6
Year ending June 30—			
1907.....	197,321	191,204	96.9
1908.....	147,554	137,526	93.2
1909.....	196,097	163,733	83.5
1910.....	140,236	127,743	91.1
1911.....	93,986	88,986	94.6
1912.....	160,553	149,303	92.9
1913.....	181,653	170,473	93.8
1914.....	404,885	361,135	89.6
1915.....	602,288	583,588	96.9
Total.....	2,284,674	2,150,293	94.1

All cement purchased during the fiscal year has been purchased under the United States Government specifications for Portland cement issued under date of May 1, 1912, and the methods of testing employed in the laboratory have conformed with those provided for by these specifications. In the appendix, page 368, will be found a table giving the average results of all tests on accepted cement from January 1, 1904, to June 30, 1915.

Regular sets of long-time tests have been continued and occasional chemical analyses have been made as a matter of record on all brands of cement under test. Other general work has included tests on samples of concrete aggregates from various projects; water analyses for various projects; continuation of tests and analyses in connection with the investigation of the action of alkali on cement concrete; inspection of drain tile shipments for the engineer in charge of drainage, and miscellaneous tests and analyses as required. The laboratory has taken part during the year in a series of tests carried out under the auspices of the Joint Conference on Uniform Methods of Tests and Standard Specifications for Cement representing the American Society of Civil Engineers, the American Society for Testing Materials, and the United States Government.

**PURCHASE AND TRANSPORTATION OF MATERIALS.**

The purchasing and transportation office in Chicago was maintained at that point until June 15, when it was transferred to Denver, where an office is maintained with facilities for advertising and purchasing supplies and for forwarding them over the most economical and expeditious route to the projects.

Freight and express claims received during the period the Chicago office was in operation during the fiscal year amounted to \$914,693.22, of which a total of \$738,051.20 was passed for payment, leaving \$176,642.02 as the amount of unpaid claims transferred to the Denver office when the examination of such claims was transferred to that point.

The regular commercial charges on claims passed for payment would have amounted to \$1,242,416.64, while the deductions were as follows: Contract \$454,765.34, land grant \$76,017.85, and claims \$7,943.03, making the net amount paid \$703,690.42.

It will be noted that the land-grant deductions (which are equally available to all Government departments) reduced the commercial freight charges \$76,017.85, while the contract agreements (which are peculiar to the Reclamation Service only) reduced the commercial freight charges by \$454,765.34, making a net reduction for all of over 43 per cent of the regular commercial charge.

Expense bills amounting to \$76,305.28 were sent in by the projects, on which the shipper or contractor had paid the regular commercial charges, and on these expense bills \$25,444.05 was collected back from the railroads on account of land-grant and contract deductions.

**FINANCES.**

The financial condition of the service may be summed up in the following condensed statement of total receipts and expenditures. The details of these expenditures are given in the appendix.

The statement of cash receipts and payments appearing below shows that—

At the beginning of the fiscal year there were \$1,401,714.67 cash on hand.

During the year this amount was augmented by receipts from various sources to a grand total of \$16,446,794.66.

Of the twenty millions authorized by the act of June 25, 1910 (36 Stat., 855), eight and one-half millions were transferred to the reclamation fund.

Cash expenditures during the fiscal year were \$14,213,172.90.

Town-site receipts transferred to the credit of projects were \$18,436.28.

The balance on hand at the close of the fiscal year amounted to \$2,215,185.48.

By the processes of the General Land Office and the Treasury Department the receipts from sales of public lands are held in the Treasury from six to nine months before they are placed to the credit of the reclamation fund. Estimated receipts from the sale of public lands in the hands of the Treasury Department on June 30.

1915, which had not been credited to the reclamation fund amounted to approximately \$1,670,000.

The reclamation fund, which comprises the moneys received from the sale of public lands, has now reached the total of \$85,914,493.36, and from the sale of town sites \$280,723.94.

Transfer vouchers, adjusting accounts between the projects for the transfer of the value of services and equipment, amounted to \$615,657.58 during the fiscal year 1915. Since the beginning of the service the value of the transfers of supplies, materials, equipment, and services between projects has amounted to \$5,006,759.37. This system of transfers between projects has enabled the service to utilize equipment, materials, supplies, etc., to their fullest extent where needed and to charge the cost where the benefit accrued.

### CASH TRANSACTIONS.

Below is shown, in the statement of cash receipts and payments, a summation of the cash transactions during the fiscal year 1915:

#### *Statement of cash receipts and payments, fiscal year 1915.*

##### RECEIPTS.

On hand July 1, 1914 (Thirteenth Annual Report, p. 48).....	\$1, 401, 714. 67
Original receipts:	
Public-land sales.....	\$4, 100, 720. 65
Town-site sales.....	18, 436. 28
Bond loan.....	8, 500, 000. 00
	<hr/>
Repayment water-right charges.....	12, 619, 156. 93
Miscellaneous receipts.....	644, 544. 54
Collections in project offices not classified.....	1, 764, 962. 48
	<hr/>
	16, 416. 04
	<hr/>
	16, 446, 794. 66
	<hr/>

##### PAYMENTS.

From reclamation fund.....	\$5, 713, 172. 90
Bond loan.....	8, 500, 000. 00
	<hr/>
Town-site receipts transferred to credit of projects.....	14, 213, 172. 90
Balance on hand to June 30, 1915:	18, 436. 28
In Treasury.....	\$984, 722. 55
In depositories to credit of special fiscal agents....	1, 214, 046. 89
In project offices awaiting remittances.....	16, 416. 04
	<hr/>
	2, 215, 185. 43
	<hr/>
	16, 446, 794. 66
	<hr/>

### ASSETS, LIABILITIES, RESERVES, AND CAPITAL.

Below is presented a combined statement of the assets and liabilities, together with the reserves and capital, of the Reclamation Service as of June 30, 1915. This statement shows that the cash resources on June 30, 1915, were \$11,885,185.48, and that all other resources, exclusive of the net expenditure for construction and deferred operation and maintenance charges, amounted to \$23,096,763.43. This includes the unaccrued construction charges on contracts with water-right applicants, amounting to \$17,971,037.26 as well as the estimated unearned value of construction work con-

tracted, amounting to \$750,251.84 on June 30, 1915. This latter amount is offset by a contra entry under contingent obligations, as the payment thereof is contingent upon the contractors fulfilling their contracts with the service. The gross expenditures for construction work in process amount to \$107,178,371.86, comprising the cost of irrigation works as shown in the statement of construction cost by functional features. From the gross expenditures is deducted all revenue earned during construction to June 30, 1915, amounting to \$6,556,588.30, making the net cost of the construction work in process \$100,621,783.56. The deferred operation and maintenance charges amount in all to \$2,532,636.53. The grand total of assets is therefore \$138,136,369.00. The liabilities of the service amount in all to \$2,939,025.90. The reserves for repayment to the reclamation fund of the cost of the projects amount in all to \$26,612,849.74. This contains not only the value of construction contracts with water-right applicants for the original acreage subscribed, but also the acreage on which charges have been temporarily suspended on account of the land becoming waterlogged or temporarily unfit for cultivation by reason of alkali, etc. It also comprises the charges accrued on contracts with the Indian Service and those paid by the Kuhn Irrigation & Canal Co. and the Twin Falls Canal Co. for the construction of the Jackson Lake enlargement work. In addition it includes the amount forfeited, penalties paid, and the construction charges paid in advance by water-right applicants. The latter includes the sum of \$714,777.37, which amount covers construction work performed by the Salt River Valley Water Users' Association under contract with the United States for the construction of power plants and canals. It also includes the sum of \$52,269, representing credits allowed canal companies and others for canal systems taken over by the Government, both of which are included in the gross construction cost of that project. The capital of the service is represented by the actual receipts from the sale of public lands, amounting in all to \$85,914,493.36, plus the estimated amount of \$1,670,000, now with the Treasury which has not yet been audited and placed to the credit of the reclamation fund. To this is added the \$1,000,000 special appropriation for the Rio Grande Dam (34 Stat., 1357) and the \$20,000,000 bond loan authorized by the act of June 25, 1910 (36 Stat., 835), the total capital to June 30, 1915, being \$108,584,493.36. This added to the reserves and liabilities equals the amount shown above as the assets.

*Combined statement of assets, liabilities, reserves, and capital to June 30, 1915.*

ASSETS.

I. Cash:		
With Treasurer United States.....	\$984, 722. 55	
With depositaries to credit of special fiscal agents.....	1, 214, 046. 89	
Balance of bond loan available for transfer to reclamation fund, act of June 25, 1910 (36 Stat., 835).....	8, 000, 000. 00	
Estimated receipts from sales of public land with Treasurer United States, not yet audited.....	1, 670, 000. 00	
		<u>\$11, 868, 769. 44</u>

<b>II. Collections returnable to fund through Treasury:</b>		
In fiscal agents' possession awaiting remittance.....	\$10,092. 20	
In other employees' hands awaiting transfer to fiscal agents.....	6,323. 84	
		<u>\$16,416. 04</u>
<b>III. Accounts receivable:</b>		
Construction charges due and uncollected from water-right applicants.....	718,830. 94	
Construction charges unaccrued on contracts with water-right applicants.....	17,971,037. 26	
Operation and maintenance charges due and uncollected from water-right applicants....	291,009. 91	
Uncollected freight refunds.....	10,780. 95	
Uncollected water rentals.....	89,220. 96	
Uncollected miscellaneous rentals.....	70,013. 26	
Uncollected miscellaneous items.....	108,969. 27	
		<u>19,259,862. 55</u>
<b>IV. Inventories:</b>		
Mercantile stores, stock on hand.....	54,206. 98	
Animals.....	133,042. 91	
Mechanical and other equipment.....	1,671,328. 74	
Materials and supplies on hand in storehouses.	1,183,817. 73	
Goods in transit.....	10,723. 35	
Unadjusted transfers between projects.....	27,007. 66	
Undistributed cost (freight and handling on inventory property).....	6,523. 67	
		<u>3,086,649. 04</u>
<b>V. Construction work contracted:</b>		
Unearned value of construction work contracted.....		750,251. 84
<b>VI. Construction work in process:</b>		
Gross expenditures for construction of projects to date.....	107,178,371. 86	
Less revenues earned during construction as follows:		
Rentals of cottages.....	\$128,041. 72	
Rentals of grazing lands.....	148,517. 03	
Rentals of power and light....	711,482. 74	
Rentals of irrigation water... 2,	568,392. 24	
Rentals of telephone.....	13,005. 65	
Miscellaneous revenues.....	220,470. 60	
Profits on mess houses.....	167,380. 04	
Profits on mercantile stores...	332,089. 11	
Profits on hospitals.....	31,429. 11	
Receipts from sale of town-site lots.....	280,723. 94	
Contractors' freight refunds..	193,973. 33	
Forfeitures by defaulting bidders and contractors.....	123,174. 50	
Adjustments—		
Depreciation on plant and equipment.....	1,548,882. 07	
Profits shown on Government animals.....	29,171. 77	
Miscellaneous.....	62,134. 09	
Loss on operation of railroads..	<sup>1</sup> 2,279. 64	
		<u>6,556,588. 30</u>
Net expenditures for construction of projects to date.....		100,621,783. 56
Deferred operation and maintenance charges.....		2,532,636. 53
Total assets.....		<u>138,136,369. 00</u>

<sup>1</sup> Deduct.



## LIABILITIES, RESERVES, AND CAPITAL.

VII. Accounts payable:		
Unpaid labor.....	\$328,380.31	
Unpaid purchases.....	400,807.46	
Unpaid progress earnings under construction contracts.....	336,350.66	
Unpaid contract holdbacks.....	297,042.56	
Unpaid freight and express charges.....	428,314.18	
Unpaid passenger fares.....	23,824.16	
Unpaid agreements to purchase real estate...	95,806.37	
Unredeemed coupon books.....	3,448.10	
Unredeemed meal tickets.....	1,438.26	
Unpaid miscellaneous.....	94,135.71	
Unpaid value of transmission line (Salt River project).....	179,226.29	
		<b>\$2,188,774.06</b>
VIII. Contingent obligations:		
Unearned value of construction work contracted.....		750,251.84
IX. Reserves for repayment to reclamation fund of cost of projects:		
Value of construction contracts with water-right applicants.....	21,178,287.00	
Value of construction contracts with water-right applicants temporarily suspended....	834,060.62	
Construction charges paid in advance by water-right applicants and Salt River Valley Water Users' Association.....	1,004,895.12	
Construction charges paid and forfeited by water-right applicants.....	25,230.96	
Penalties paid on construction charges by water-right applicants.....	6,379.63	
Miscellaneous items—		
Construction charges accrued on contracts with Indian Service.....	3,004,624.54	
Construction charges paid on Jackson Lake enlargement work.....	559,371.87	
		<b>26,612,849.74</b>
X. Capital:		
Reclamation fund.....	\$86,195,217.30	
Less town-site receipts transferred to credit of projects.....	280,723.94	
		85,914,493.36
Rio Grande Dam appropriation (34 Stat., 1357).....	1,000,000.00	
Bond loan (36 Stat., 835).....	20,000,000.00	
Estimated reclamation fund with Treasurer United States, not yet audited.....	1,670,000.00	
		<b>108,584,493.36</b>
Total liabilities, reserves, and capital.....		<b>138,136,369.00</b>

## CONSTRUCTION COSTS BY FUNCTIONAL FEATURES.

The statement which follows gives by functional features the amount of money expended in the construction of all storage works, canal systems, lateral systems, drainage and other protection systems, power systems, and other construction accounts of all projects, including the Blackfeet, Flathead, and Fort Peck Indian projects.

*Functional feature costs of all projects to June 30, 1915.*

Examination and survey.....	\$4, 163, 682. 11
Storage systems.....	29, 742, 732. 73
Pumping for irrigation.....	663, 506. 62
Canal systems.....	39, 553, 048. 39
Lateral systems.....	15, 512, 399. 26
Drainage systems.....	1, 639, 017. 50
Flood protection.....	2, 169, 038. 05
Power systems.....	5, 662, 517. 37
Farm units.....	459, 858. 51
Permanent structures and land.....	2, 465, 396. 19
Telephone systems.....	413, 067. 90
Operation and maintenance during construction.....	4, 590, 128. 87
Operation and maintenance charges added to construction.....	72, 778. 04
Stores and other operations.....	71, 200. 32
Total.....	107, 178, 371. 86

**OPERATING REVENUES AND EXPENSES.**

There follows a combined statement giving the revenues and expenses for the operation of projects which have been opened by public notices of the Secretary of the Interior. These revenues and expenditures are those resulting from operations connected with the lands thrown open to water-right applicants by these public notices and do not include the transactions resulting from the temporary operation of canals during the construction period.

*Combined statement of operating revenues and expenses to June 30, 1915.***EXPENSES.**

Development (storage) works:	
Operation.....	\$592, 044. 00
Maintenance.....	275, 539. 75
Canal systems:	
Operation.....	386, 291. 42
Maintenance.....	841, 748. 07
Lateral systems:	
Operation.....	678, 837. 60
Maintenance.....	1, 234, 549. 77
Drainage and flood protection:	
Operation.....	27, 472. 14
Maintenance.....	779, 991. 04
Undistributed expenses:	
Operation.....	96, 031. 88
Maintenance.....	242, 992. 94
Supplemental construction.....	383, 726. 99
Less accrued and unpaid operation and maintenance charges added to construction charges.....	<u>1 72, 778. 04</u>
Total.....	<u>5, 466, 447. 56</u>

**REVENUES.**

Operation and maintenance charges accrued on contracts with water-right applicants.....	2, 436, 851. 91
Operation and maintenance charges paid in advance by water-right applicants.....	12, 114. 08
Operation and maintenance charges paid and forfeited by water-right applicants.....	11, 472. 21
Rentals of lands and buildings.....	19, 613. 86
Rentals of power and light.....	124, 826. 49
Rentals of irrigation water.....	224, 161. 46
Miscellaneous revenues.....	104, 771. 02
Deferred operation and maintenance charges (carried to debit side of assets and liabilities statement).....	<u>2, 532, 636. 53</u>
Total.....	<u>5, 466, 447. 56</u>

<sup>1</sup> Contra entry.

**REPAYMENT CONTRACTS.**

The development of the projects has resulted in water-right applications or contracts that have been entered into with settlers, providing for repayment to the Government of the cost of constructing the works for irrigating their lands. These contracts, under provisions of the reclamation law, require complete repayment of construction charges in 10 annual installments, but the reclamation extension act gives such of those as accept its terms and to those not now under such contracts the right to repay in 20 years in annual installments, so graduated as to place upon the irrigator a minimum burden during the early years of farm development. On 16 projects the lands have been opened to entry and settlement and the construction charges fixed by public notice. Contracts with water-right applicants for repayment to the reclamation fund of the cost of projects total \$22,012,347.62. Of this amount there has been collected \$3,338,362.48 of the accrued charges, leaving the unpaid value of these contracts on June 30, 1915, \$18,673,985.14.

There are still large acreages of land on most of the projects to which the service is now ready to furnish irrigation water and which are being taken up from day to day and new contracts signed. On all the projects the present net investment of the Government exceeds the asset value of the contracts. When all of the lands susceptible of irrigation are covered by contracts, the value of the contracts on any project should equal the amount of the total investment thereon. It is to be noted in this connection, however, that on several of the projects additional investment will be necessary to make all of the lands irrigable.

**ESTIMATED COST OF CONTEMPLATED WORK.**

It is estimated that there will be expended during the fiscal year 1916 the sum of \$11,113,902.67. The following table gives the tentative distribution of this amount to the various functional features of all projects, including the Blackfeet, Flathead, and Fort Peck Indian projects. The details are given under a similar heading for each project.

*Estimated cost of contemplated work on all projects during fiscal year 1916.*

Examination and surveys.....	\$151,680.45	
Storage systems.....	1,695,052.95	
Pumping for irrigation.....	7,500.00	
Canal systems.....	2,548,004.33	
Lateral systems.....	1,900,991.73	
Drainage systems.....	938,624.50	
Flood protection.....	286,175.00	
Power systems.....	77,072.15	
Farm units.....	59,046.10	
Permanent improvements and lands.....	155,683.40	
Telephone systems.....	29,137.00	
Operation and maintenance:		
During construction.....	\$1,053,973.41	
Under public notice.....	838,405.00	
		1,892,378.41
Stores and other operations.....		692,100.00
Unallotted to features.....		680,456.65
Total.....		<u>11,113,902.67</u>

**COST OF INVESTING THE RECLAMATION FUND.**

In the thirteenth annual report there was for the first time presented a statement of the general expenses by calendar years showing the gross expenditures and the ratio of the general expense thereto. The figures shown for general expense were estimates based on partial returns from an investigation instituted to determine the ratio of general expense to all other expenditures. These accounts, as presented in the thirteenth annual report, had been kept by calendar years, but owing to the change of policy involving annual appropriations by fiscal years, a readjustment of these accounts was immediately undertaken.

There is presented herewith a statement showing by fiscal years the actual gross expenditures from the reclamation fund and the actual total amount of general expense, together with the ratio of general to all other expenditures. The results shown by this table differ somewhat from those given in the table of estimates presented in the thirteenth annual report. By reference to the table which follows it will be found that the average cost of investing \$100 in the construction and maintenance of the permanent works of the Reclamation Service has been \$8.39 during the past 13 fiscal years. The overburden of general expense reached its maximum in the fiscal year ended June 30, 1913, when it cost \$11.27 to invest each \$100 expended on the construction and maintenance of permanent works. This was reduced in the year ending June 30, 1915, to \$7.26 per \$100. It had been estimated that the cost for the calendar year 1914 (embracing one-half of the fiscal year 1915) would be less than \$6 per \$100. This estimate was based on a total investment of over \$20,000,000 during that period. The actual total amount invested, however, did not reach \$20,000,000 during the calendar year 1914, but was limited instead to \$14,448,457. The general expense for that period was \$974,932, or slightly in excess of 7 per cent instead of 6 per cent, as estimated.

*Statement showing, by fiscal years, the gross expenditures from the reclamation fund less general expense, the total amount of general expenses of the service, and the ratio of general expenses to all other expenditures.*

Fiscal year.	Gross expenditures exclusive of general expense.	General expense.	Ratio of general to all other expenditures.
1903.....	\$245,548.27	\$23,516.20	9.59
1904.....	1,395,178.17	118,253.05	8.43
1905.....	3,450,812.79	319,384.44	9.25
1906.....	7,007,285.71	546,237.15	7.79
1907.....	12,188,889.87	755,164.91	6.19
1908.....	11,358,174.72	792,970.33	6.98
1909.....	10,037,536.09	887,484.08	8.84
1910.....	9,543,060.87	873,496.00	9.15
1911.....	9,100,885.25	837,501.27	9.86
1912.....	11,316,314.42	892,565.41	7.89
1913.....	8,507,467.36	958,443.72	11.27
1914.....	10,055,187.91	1,002,333.39	9.97
1915.....	14,583,178.54	1,053,809.74	7.26
Total.....	108,789,519.77	9,126,189.19	8.39

**PERSONNEL.**

On June 30, 1915, the force of the Reclamation Service comprised 8,373 persons, subdivided as follows: Educational, 580; noneducational, 1,738; laborers, etc., employed temporarily and locally on the various projects, 6,055. In addition the employees of contractors working on reclamation projects numbered 2,147. A more detailed statement, giving the administrative personnel of the service and the number of employees by projects, classified as above, will be found in the appendix.

*Injuries to employees.*—Under the terms of the compensation act of May 30, 1908, 656 injuries to employees were reported during the calendar year 1914, the corresponding figure for 1913 being 413. In 1914 claims for compensation were allowed in 394 of the cases of reported injury, or 60.1 per cent, and in 1913 in 229 cases, or 55.4 per cent. The average compensation paid for injuries received in 1913 amounted to \$166.73, as compared with \$206.61 in 1912. Payments have not yet been completed for injuries received in 1914. Further detailed statistics showing the number of injuries reported, claims allowed, and compensation paid, by projects, since 1908, will be found in the appendix.

*Medical care of employees.*—The question of the proper medical care of employees is one which confronts the service on all of its projects. In isolated localities or on large construction work it is the practice to employ physicians appointed through civil-service channels or contract physicians. During the past fiscal year civil-service physicians were employed on the Boise, Rio Grande, Grand Valley, Truckee-Carson, and Milk River projects, on the Sunnyside unit of the Yakima project, and on the Jackson Lake enlargement work. Similarly contract physicians were employed on the Salt River and Yuma projects and on the Storage unit of the Yakima project. On practically all other projects the services of local physicians have been utilized, payment for their services being made from the so-called hospital fund accumulated through deductions of \$1 a month from the pay of employees.

Under the present policy of the service the employment of civil-service and contract physicians will be discontinued as rapidly as practicable and the services of local physicians utilized entirely, as this latter arrangement has proved eminently satisfactory. Where necessary, arrangements are made with local hospitals for the treatment of sick or injured employees.

*Inoculation with typhoid prophylactic.*—In cooperation with the War Department the use of typhoid prophylactic among the field employees of the service has been continued, over 500 complete treatments having been sent to the field during the fiscal year, making a total since July, 1912, of about 2,400 treatments. Reaction reports have been received from 979 cases. During the past fiscal year such reports were received from 279 cases and these are summarized in the following table:

	Number of patients.	Reaction.			
		Absent.	Mild.	Moderate.	Severe.
First dose.....	279	206	60	12	1
Second dose.....	213	159	47	12	.....
Third dose.....	184	153	24	6	1
Per cent:					
First dose.....	100	73.8	21.5	4.3	.4
Second dose.....	100	72.9	21.6	5.5	.....
Third dose.....	100	83.2	13.0	3.2	.6

The slight degree of discomfort accompanying the inoculations is indicated by the fact that following the first dose the reactions were either absent entirely or mild in character in 95.3 per cent of the cases, after the second dose in 94.5 per cent, and after the third dose in 96.2 per cent, while severe reactions occurred in only two instances, the reaction being considered severe when the patient had a temperature of 103° or over.

Of the 279 employees receiving the treatment, 184 received the full treatment, consisting of three inoculations, 34 received only two inoculations, and 61 only one.

## DISCUSSION OF PROJECTS.

(A brief statement of the origin of each project and of the preliminary investigations made and a concise description of the construction work completed prior to July 1, 1910, may be found in the ninth annual report. For detailed tables on cement, unit bids and contract prices, engineering data for projects on completion, summary of results to June 30, 1915, crops and operation and maintenance data, finances, etc., see appendix.)

### ARIZONA, SALT RIVER PROJECT.

W. S. CONE, project manager, Phoenix, Ariz.

#### LOCATION.

Counties: Maricopa and Gila.

Townships: 2 S. to 3 N., Rs. 1 to 6 E. and 1 W., and Tps. 3 to 5 N., Rs. 11 to 14 E., Gila and Salt River base and meridian.

Railroads: Santa Fe, Prescott & Phoenix; Arizona Eastern.

Railroad stations and other towns, showing estimated population January 1, 1915: Phoenix, 23,600; Mesa, 3,000; Glendale, 1,200; Tempe, 2,000; Chandler, 600; Peoria, 300; Gilbert, 50; Scottsdale, 50; Higley, Lehi, Tolleson, and Laveen, each under 25.

#### WATER SUPPLY.

Source of water supply: Salt and Verde Rivers and wells in various parts of the valley.

Area of drainage basins at Granite Reef Dam: Salt River, 6,250 square miles; Verde River, 6,000 square miles.

Annual run-off in acre-feet: Salt River at Roosevelt (5,760 square miles), 1889 to 1914, maximum, 3,226,470; minimum, 153,394; mean, 772,052. Verde River at McDowell (6,000 square miles), 1889 to 1914, maximum, 1,801,500; minimum, 116,679; mean, 562,065.

#### AGRICULTURAL AND CLIMATIC CONDITIONS.

Area for which service is prepared to supply water, season of 1915: 192,000 acres, consisting of 173,000 acres of private and homestead land contracted with the water users' association, 11,000 acres cultivated school land, and 8,000 acres under town sites.

Area under rental contracts, season of 1915: 187,000 acres.

Length of irrigating season: 365 days, October 1 to September 30.

Average elevation of irrigable area: 1,200 feet above sea level.

Average annual rainfall on irrigable area: 31-year period, approximately 8 inches; calendar year 1914, 10.89 inches; wet year.

Range of temperature on irrigable area: 22° to 117° F.

Character of soil of irrigable area: Sandy loam, with clay in places.

Principal products: Alfalfa, grain, cotton, semitropical fruits.

Principal markets: Phoenix and other Arizona towns, Pacific coast cities, and eastern markets.

#### LANDS OPENED FOR IRRIGATION.

No lands have been opened for irrigation by public notice. All lands are being irrigated under rental contracts.

## CHRONOLOGICAL SUMMARY.

Reconnaissance made and preliminary surveys begun: 1902.  
 Construction recommended by the director: March 7, 1903.  
 Construction conditionally authorized by Secretary: March 14, 1903.  
 Grand, Water Power, Salt River Valley, Maricopa, and Joint Head Canals purchased: June 15, 1906.  
 Power Canal completed: October, 1906.  
 Irrigation by the Reclamation Service begun: May 15, 1907.  
 Granite Reef Dam completed: August, 1908.  
 South Canal completed: June, 1909.  
 Eastern Canal completed: December, 1909.  
 Roosevelt Dam completed: February 5, 1911; formal dedication, March 18, 1911.  
 San Francisco pumping plant completed: October, 1911.  
 Western Canal completed: February, 1913.  
 Highline pumping plant put in operation: June, 1913.  
 Raising of spillways, Roosevelt Dam, completed: August, 1913.  
 Joint Head Dam completed: March, 1914.  
 Reconstruction of the Arizona Canal completed: February, 1915.  
 McQueen pumping plant completed: March, 1915.  
 Farm unit survey completed: April, 1915.  
 Water over spillways of Roosevelt Reservoir: April 14, 1915.  
 Survey for silt deposit in Roosevelt Reservoir: June, 1915.  
 South Side Canal System completed: June, 1915.  
 Project 98 per cent completed: June 30, 1915.

## IRRIGATION PLAN.

The irrigation plan of the Salt River project provides for the storage of water in the reservoir created by the building of the Roosevelt Dam, which is situated at the confluence of Tonto Creek and Salt River, about 70 miles northeast of Phoenix, Ariz. This stored water is carried down Salt River to a point about 4 miles below the mouth of the Verde River, where, together with such water as may be discharged by the Verde, it is diverted to the North and South Side Canal systems by the Granite Reef Diversion Dam. The water supply for the canals on the north side of the river is further augmented by the water diverted by the Joint Head Diversion Dam.

There have been completed and put into operation nine pumping plants with an approximate capacity each of 10 second-feet. A pumping plant located at the junction of the Western Canal and the Kyrene branch pumps water through a 54-inch pressure pipe 5,930 feet long to an elevation of 40 feet and waters approximately 7,500 acres of land. The United States claims all waste, seepage, unappropriated spring, and percolating water arising within the project, and proposes to use such water in connection therewith.

The canal and lateral system at present comprises 782.6 miles, and on completion of the project provides for the delivery of water to each 160-acre tract of irrigable land.

A power plant located at Roosevelt generates power from stored water in the reservoir and from water delivered from the Power Canal, heading at a diversion dam in Salt River, 19 miles above the storage dam. Other power plants completed and in course of construction by the water users' association and which will ultimately become a part of the project are the South Consolidated, the Arizona Falls, and the Cross Cut. A portion of the power developed will be used for pumping water for irrigation and the remainder for industrial purposes.

The principal features completed are the Roosevelt Dam, Granite Reef Dam, the main canals of the distributing system, and practically the power system. There remain to be completed the final unit of the Roosevelt Power Plant and some work on the sluicing tunnel and the spillway.

## CONSTRUCTION DURING FISCAL YEAR.

*Roosevelt power plant.*—The installation of the final unit of the Roosevelt power plant was commenced. The heavy rains of April interfered with the hauling of the material and equipment and in consequence work will have to be delayed until the water ceases to run over the spillways of the dam.



*Pumping plants.*—The McQueen wells were reequipped. These wells, both in production and quality of water, rank high.

*Canals.*—The principal work on the project was the completion of the canal system. On the north side the most important work was building the Cave Creek cut-off on the Arizona Canal. Some 3 miles of new canal were built under contract with Martin & Gillis, who also built several structures along the canal. Maney Bros., contractors, built the structures in the cut-off.

On the south side the Wallace Feeder was built under contract with S. J. Rhoades. Important structures were put in on the Consolidated Canal and the canal widened. A sluice gate was installed on the South Canal near the South-Consolidated power plant.

*Old laterals.*—In March, 1915, \$100,000 was allotted for taking over and rehabilitating old laterals. This work has been pushed to the utmost, and approximately 46 miles have been reconstructed on the north side and 13 miles on the south side.

*Water users' association work.*—The construction of the Cross Cut power plant is practically completed.

#### OPERATION AND MAINTENANCE.

Irrigation works operated during the fiscal year 1915 included the Roosevelt Reservoir; Granite Reef Dam; Joint Head Dam; the Arizona, Grand, Maricopa, and Salt River Valley Canals on the north side of the river; the South Canal, Consolidated, Mesa, Eastern, High-line, Western, and San Francisco Canals on the south side of Salt River. In addition, water was pumped from batteries A, B, C, D, E, F, Clemans, McQueen, and San Francisco wells in connection with the water distribution on the south side of the river. Water was supplied to the canals on the north side through the Arizona Canal and the Joint Head. On the south side gravity water was furnished through the South Canal. The total area irrigated with water supplied through the canals of the United States Reclamation Service was 187,112 acres. About 12,000 acres lying under the Tempe Canal were supplied with water through the South Canal, operated by the Reclamation Service. The Tempe Canal is an independent organization, and the water was supplied to the head of their canal in accordance with contract approved May 15, 1915. For the year ending June 30, 1915, there were diverted through the canals of the Reclamation Service 831,438 acre-feet of water, of which 498,862 acre-feet were actually applied to the land. On April 14, 1915, the reservoir reached its maximum contents and water commenced pouring over the spillways. After the reservoir water surface reached the 225-foot mark there was a temporary water storage, which on May 5, 1915, reached the 228.16-foot level and which represented a contents of 1,421,168 acre-feet. The maximum amount over the spillways was 3 feet on May 3, 1915. The minimum amount stored in the Roosevelt Reservoir during the fiscal year was on October 3, 1914, when the gauge height was 112.12 feet and the contents 158,748 acre-feet. On June 30, 1915, the elevation of the reservoir was 223.36 feet, representing a storage of 1,339,748 acre-feet, a net gain at the end of the fiscal year of 100 feet in elevation and a volume of 1,120,465 acre-feet.

Operation and maintenance work has consisted almost entirely of removing sediment from canals and laterals, cleaning weed growth along the banks, cleaning moss from the beds of the canals, and repairing existing structures. One herd of goats, 465 head, and 2 bands of sheep, numbering at their maximum 1,475, were used to eradicate the weed growth on the banks of canals and laterals. These sheep and goats not only reduced the cost of maintaining many miles of canals and laterals, but in addition yielded a handsome profit. During December, 1914, water was cut out of the south side canals and during January, 1915, out of the north side canals for the purpose of putting in structures and cleaning silt from the canal beds. The balance of the time water was run in all canals of the service. At the beginning of the agricultural year, October 1, 1914, the total length of canals and laterals operated by the Reclamation Service was 715 miles. At the end of the fiscal year 1915 the Reclamation Service had acquired by deed from private parties and had reconstructed 59 miles of laterals and had built 8.6 miles of new laterals, making a total of 782.6 miles of canals and laterals. All the pumping plants were operated continuously as far as possible and materially augmented the supply available for irrigation, except during the period of high water, which lasted from the middle of December to the middle of January.

The run-off on the Salt River and the Verde River watersheds was unusually heavy, resulting in a plentiful supply of water in the river for irrigation purposes, and the reservoir filled to capacity. During the fiscal year water was delivered for irrigation purposes for one-third of the time at one-half the usual rates, which during the present agricultural year are as follows: \$1 for not to exceed 2 acre-feet; 50 cents each for the third and fourth acre-feet and 75 cents per acre-foot in excess of 4 acre-feet per acre of land signed in the water users' association, and for land not signed in the water users' association, \$1.20 for not exceeding 2 acre-feet per acre; 60 cents each for the third and fourth acre-feet and 75 cents per acre-foot in excess of 4 acre-feet per acre.

On May 5, 1915, the Secretary of the Interior approved the selling of water under rental contract to those lands classed as uncultivated by the board of survey for that period of time ending September 30, 1915. The rates are the same as those first mentioned for land signed in the association.

On account of the plentiful supply the average use of water has been high and the duty of water somewhat lower than the preceding year.

*Historical review, Salt River project.*

Item.	1910	1911	1912	1913	1914	1915
Acres for which service was prepared to supply water.....	150,000	160,000	160,000	190,000	187,112	192,000
Acres irrigated.....	92,251	115,042	128,628	163,312	<sup>1</sup> 187,112	192,000
Miles of canal operated.....	499	534	576	715	715	782.6
Water diverted (acre-feet).....		551,093	663,256	770,063	804,924	831,438
Water delivered to land (acre-feet).....	382,000	352,699	430,928	462,037	446,730	496,862
Per acre of land irrigated (acre-feet).....	3.6	3.53	3.94	2.97	2.62	2.66

<sup>1</sup> Includes towns and Tempe Canal lands.

**SETTLEMENT.**

Although the cutting up of large tracts into smaller holdings has continued, the number of transfers in the past 12 months has been less than normal. This is due to a number of causes and not to any one particular reason. Considerable progress has been made in the organization and perfection of cooperative associations, but the greatest point yet to be gained is to secure the whole-souled support of all the members for the common cause.

*Settlement data, Salt River project.*

Item.	1912	1913	1914	1915
Total number of farms on project.....	2,954	2,680	3,068	<sup>1</sup> 3,600
Population of.....	18,250	20,000	20,500	<sup>1</sup> 22,000
Number of irrigated farms.....	2,954	2,680	3,068	<sup>1</sup> 3,600
Operated by owners or managers.....	1,999	1,945	2,459	<sup>1</sup> 2,700
Operated by tenants.....	955	735	609	<sup>1</sup> 900
Population of.....	18,250	20,000	<sup>1</sup> 20,500	<sup>1</sup> 22,000
Number of towns.....	11	11	11	12
Population of.....	25,000	26,600	<sup>1</sup> 30,500	<sup>1</sup> 31,000
Total population in towns and on farms.....	43,250	46,600	<sup>1</sup> 51,000	<sup>1</sup> 53,000
Number of public schools.....	50	62	60	60
Number of churches.....	44	48	50	50
Number of banks.....	9	11	11	12
Total capital stock.....	\$681,000	\$625,100	\$796,500	\$828,500
Total amount of deposits.....	\$6,716,292	\$7,986,234	\$9,353,519	<sup>1</sup> \$9,000,000

<sup>1</sup> Estimated; exact figure not available.

**PRINCIPAL CROPS.**

The area in cotton in the agricultural year 1913-14 amounted to 11,500 acres and was valued at \$715,000, while the area planted to cotton as reported in June, 1915, amounts to less than 2,000 acres. A larger acreage was planted to cantaloupes and watermelons during the spring of 1915 than in any previous year. The crop will be a little late, but the production promises to be above average. All kinds of deciduous fruits are in excellent condition and the citrus fruits promise a heavy yield. Considering the entire project and the condition of all crops it is believed that the returns from the crops harvested during the agricultural year 1914-15 will be far above average and in many cases will be classed as "bumper." In spite of heavy wind and rain at a time when wheat was about ready for harvesting the production was excellent and considered the best for many years. Olives are doing well and a heavy yield is predicted.

*Crop report, Salt River project, Arizona, for agricultural year from Oct. 1, 1913, to Sept. 30, 1914.*

Irrigated crop.	Area (acres).	Unit of yield.	Yields.		Values.		
			Total.	Average per acre.	Per unit of yield.	Total.	Per acre.
Alfalfa.....	86,733	Ton.....	260,198	3	\$6.00	\$1,561,189	\$18.00
Barley.....	17,066	Bushel.....	426,644	25	.65	277,318	16.25
Beans.....	567	do.....	9,080	16	2.40	21,792	38.40
Cane, sugar.....	901	Ton.....	10,812	12	4.00	43,248	48.00
Corn, broom.....	115	do.....	57	0.5	75.00	4,313	37.50
Cotton:							
Long staple.....	9,549	Pound.....	3,342,237	350	.20	668,437	70.00
Short staple.....	1,952	do.....	565,600	300	.08	46,848	24.00
Cantaloupes.....	1,846	do.....	7,198,425	3,900	.018	129,572	70.20
Corn:							
Indian.....	2,315	Bushel.....	46,295	20	.85	39,351	17.00
Sorghum.....	12,651	do.....	316,275	25	.50	158,137	12.50
Fodder.....	628	Ton.....	393	0.625	20.00	7,850	12.50
Fruits:							
Citrus.....	707	Pound.....	2,472,750	3,500	.04	98,910	140.00
Small.....	927	do.....	3,242,750	3,500	.04	129,710	140.00
Deciduous.....	1,246	do.....	4,984,640	4,000	.025	124,616	100.00
Garden.....	1,179					100,236	85.00
Hay (except alfalfa).....	1,037	Ton.....	1,556	1.5	6.00	9,335	9.00
Oats.....	1,930	Bushel.....	67,550	35	.55	37,153	19.25
Olives.....	133	Pound.....	66,750	500	.03	2,003	15.00
Pasture.....	22,261				12.00	267,138	12.00
Potatoes.....	232	Bushel.....	6,967	30	.95	6,619	28.50
Wheat.....	9,744	do.....	194,890	20	1.10	214,379	22.00
Watermelons.....	826	Ton.....	9,091	11	10.00	90,915	110.00
Less duplicated areas.....	4,826						
Total cropped acreage.....	169,719	Total and average.....				4,039,079	23.80

Irrigated, no crop:		Areas.	Acres.	Farms.	Per cent of project. <sup>1</sup>
Citrus, young.....	384	Total irrigable area farms reported.	194,866	3,068	92.19
Olives, young.....	812	Total irrigated area farms reported.	173,080	3,068	81.86
Miscellaneous.....	2,615	Under rental contracts.....	173,030	3,068	81.86
Total irrigated.....	173,030	Total cropped area farms reported.	169,720	3,068	80.29
Water purchased—land vacant	9,948.71				
Total.....	182,978.71				

<sup>1</sup> Based on 211,367 acres, irrigable area exclusive of town sites.

### FINANCIAL STATEMENTS.

*Assets, liabilities, reserves, and capital, Salt River project, to June 30, 1915.*

#### ASSETS.

Accounts receivable:		
Uncollected water rentals.....	\$8,366.26	
Uncollected miscellaneous rentals.....	56,653.60	
Uncollected miscellaneous items.....	13,376.63	
Unadjusted time-book deductions.....	1,419.85	
Total.....		\$79,816.34
Inventories:		
Mechanical and other equipment.....	62,130.65	
Material and supplies on hand in storehouses.....	127,414.32	
Goods in transit.....	600.00	
Unadjusted transfers between projects.....	138.75	
Undistributed cost (unadjusted inventory value, and freight and handling on inventory property).....	21,129.56	
Total.....		211,235.78

<sup>1</sup> Deduct.

## Construction work in process:

Gross expenditures for construction of project to date.....	\$13,614,279.77
Less revenue earned during construction as follows:	
Rentals of buildings.....	\$12,255.64
Rentals of grazing lands.....	18,806.14
Rentals of power and light.....	628,628.03
Rentals of irrigation water.....	1,367,352.21
Rentals of water for power purposes.....	41,236.78
Miscellaneous revenues.....	11,746.62
Contractors' freight refunds.....	19,269.63
Forfeitures by default—bidders and contractors.....	4,296.30
Profits on mess houses.....	17,646.78
Profits on mercantile stores.....	2,609.37
Loss on hospital.....	1788.61
Adjustments—	
Depreciation on plant and equipment.....	222,580.58
Total deductions.....	2,345,639.47
Net expenditures for construction of project to date.....	\$11,268,640.30
Total assets.....	11,559,692.42

## LIABILITIES, RESERVES, AND CAPITAL.

## Accounts payable:

Unpaid progress earnings under construction contracts.....	\$9,358.37
Unpaid contract holdbacks.....	15,485.38
Unpaid labor.....	14,971.63
Unpaid purchases.....	13,057.72
Unpaid freight and express.....	24,156.84
Unpaid passenger fares.....	331.21
Unpaid agreements to purchase real estate.....	2,778.70
Unpaid miscellaneous.....	2,004.82
Total.....	82,144.67
Unpaid value of transmission line built by the Inspiration Consolidated Copper Co., under contract.....	179,226.29
Reserves for repayment to reclamation fund of cost of project:	
Construction water right charges paid in advance by water-right applicants.....	152,269.00
Value of power plants built by Salt River Valley Water Users' Association, included in gross construction cost of project.....	714,777.37
Total.....	867,046.37
Net investment:	
Disbursements.....	\$12,783,971.50
Transfers received from other projects.....	393,187.26
	13,177,158.76
Less—	
Collections.....	2,682,502.74
Transfers issued to other projects.....	63,380.93
	2,745,883.67
Total.....	10,431,275.09
Total liabilities, reserves, and capital investment of the Government.....	11,559,692.42

*Functional feature costs of Salt River project to June 30, 1915.*

Examination and surveys.....	\$83, 939. 83
Storage system.....	3, 835, 350. 17
Pumping for irrigation.....	167, 306. 38
Canal system.....	2, 380, 439. 65
Lateral system.....	612, 928. 00
Drainage system.....	2, 680. 22
Power system.....	3, 737, 306. 10
Farm units.....	28, 123. 47
Permanent structures and land.....	741, 114. 44
Telephone system.....	69, 695. 19
Operation and maintenance during construction.....	1, 954, 472. 63
Stores and other operations.....	923. 69
Gross expenditure for construction of project to date.....	13, 614, 279. 77

*Estimated cost of contemplated work, Salt River project, during fiscal year 1916.*

Storage system.....	\$35, 000. 00
Lateral system: Preliminary and general work.....	500. 00
Drainage system: Preliminary and general work.....	1, 887. 50
Power system: Installation of sixth unit, Roosevelt power plant.....	16, 482. 50
Permanent structures and land: Real estate and permanent improvements.....	4, 000. 00
Telephone system: Telephone lines extending present system.....	1, 063. 00
Operation and maintenance during construction.....	426, 420. 66
Stores and other operations: Reimbursable accounts.....	36, 850. 00
Unallotted to features.....	14, 276. 34
Total.....	536, 480. 00

## **ARIZONA-CALIFORNIA, YUMA PROJECT.**

L. M. LAWSON, project manager, Yuma, Ariz.

### **LOCATION.**

Counties: Yuma, Ariz.; Imperial, Cal.  
Townships: 3 to 13 S., Rs. 21 to 25 W., Gila and Salt River meridian; 9 to 17 S., Rs. 16 to 23 E., San Bernardino meridian.  
Railroad: Southern Pacific.  
Railroad stations and estimated population January 1, 1915: Yuma, Ariz., 4,500; Potholes, Cal., 25.

### **WATER SUPPLY.**

Source of water supply: Colorado River.  
Area of drainage basin: 229,000 square miles above Laguna Dam.  
Annual run-off in acre-feet of Colorado River at Yuma (287,000 square miles), 1902 to 1914: Maximum, 26,000,000; minimum, 7,960,189; mean, 16,640,000.

### **AGRICULTURAL AND CLIMATIC CONDITIONS.**

Area for which the service is prepared to supply water, season of 1915: 71,200 acres.  
Area under water-right applications and rental contracts, season of 1915: 39,153 acres.  
Length of irrigating season: 365 days.  
Elevation of irrigable area: 100 to 300 feet above sea level.  
Average annual rainfall on irrigable area: Five years, 2.91 inches; 16 years, 3.62 inches; 1914, 3.70 inches: relatively wet year.  
Range of temperature on irrigable area: 22° to 118° F.  
Character of soil of irrigable area: Bottom lands, rich alluvium; mesa lands, freso gravelly sand.  
Principal products: Semitropical fruits, alfalfa, grain, and cotton.  
Principal markets: Los Angeles and San Francisco, Cal.; Arizona towns; and eastern markets for early produce.

### **LANDS OPENED FOR IRRIGATION.**

Date of public notices: January 12, 1910; March 8, 1912; March 6, 1913; June 23, 1913.  
Location of lands opened: Ts. 15 and 16 S., R. 23 E., San Bernardino meridian.  
Present status of irrigable lands opened: 6,503 acres entered, subject to the reclamation act and the act of April 21, 1904.  
Limit of area of farm units: Public, 40 acres.  
Duty of water: 5½ acre-feet per acre per annum at the farm.  
Building charge per acre of irrigable land: \$55 and \$66.  
Annual operation and maintenance charge: 75 cents per acre minimum charge, which entitles the water user to 1 acre-foot per acre of irrigable land. Water in excess of this amount will be charged at 75 cents per acre-foot.

### **CHRONOLOGICAL SUMMARY.**

Reconnaissance made and preliminary surveys begun in 1902.  
Construction recommended by board of engineers April 8, 1904.  
Construction authorized by Secretary May 10, 1904.  
Canal system of Colorado Valley Pumping & Irrigating Co. purchased March 15, 1907.  
First irrigation by Reclamation Service, season of 1907.  
Canal system of Yuma Valley Union Land & Water Co. (Farmers' Gravity Canal) purchased February 3, 1908.  
Rollins ditch (including Ives heading pumps and ditches) purchased July 23, 1908.  
Laguna Dam completed March, 1909.  
Colorado River siphon completed June 29, 1912.  
Gravity water from Laguna Dam furnished to Yuma Valley through siphon June 29, 1912.  
Yuma Valley Railroad constructed June, 1914.  
Entire project 57 per cent completed June 30, 1915 (in accordance with estimate for completion prepared July, 1915).

### IRRIGATION PLAN.

The irrigation plan of the Yuma project provides for the diversion of water from the Colorado River at the Laguna Dam, 10 miles northeast of Yuma, Ariz., into two canal systems—one heading on the California side, conveying water to the irrigable lands on that side of the river, including those in the Yuma Indian Reservation, crossing the river at Yuma through an inverted siphon and serving lands in the Colorado Valley below Yuma, and the other heading on the Arizona side of the stream and watering lands in the Colorado and Gila Valleys lying east of the Colorado and north of the Gila. The plan also provides for a large pumping plant about  $2\frac{1}{2}$  miles below Yuma on the east main canal for raising water to irrigate 40,000 acres of mesa land and for a small pumping plant at the terminus of the gravity canal on the Arizona side of the river below Laguna Dam for raising the water through a small lift to irrigate about 6,000 acres. The lands adjacent to the Gila and Colorado Rivers are protected from overflow of these streams by means of levees. The United States claims all waste, seepage, unappropriated spring and percolating water arising within the project, and proposes to use such water in connection therewith. The Laguna Dam, 307.3 miles of canals and laterals, including 15.5 miles of drainage ditches; the Colorado River siphon, 930 feet in length and 14 feet in diameter; and about 74 per cent of the levee system are completed.

### CONSTRUCTION DURING FISCAL YEAR.

*Canal system.*—On the Yuma Indian Reservation the entire distribution system was completed, with the exception of a crossing under the main line of the Southern Pacific Railroad, which has been held up pending the completion of a contract with the railroad company. When this is accomplished, water will be available for the entire area of lands allotted to Indians. This construction required the completion of 18 miles of canals containing 223,562 cubic yards of excavation (including 28,256 yards in repairs), 9 small concrete structures, and 235 wooden structures of various types, comprising farm-unit gates, lateral checks and turnouts, culverts, bridges, drops, etc. Two Howe truss bridges on concrete abutments were constructed, one 110-foot span over the main canal and the other over the Reservation Drainage Canal. These are both on the line of the Ocean-to-Ocean Highway.

The distribution system of Yuma Valley was practically completed, excepting a few minor remodelings required along the old Gravity Canal of the system purchased by the United States.

Water is now available for all the irrigable lands of Yuma Valley. The completion of this system required the construction of 40.3 miles of canal from 300 second-feet capacity to 10 second-feet and the moving of 784,735 cubic yards of earth excavation. Eleven concrete structures were built in the west main canal, paralleling the Yuma Valley Railroad, containing 800 cubic yards of concrete. Concrete pipe of 30 inches diameter was used in 19 structures for farm-unit gates, lateral checks, and turnouts. For the remainder of the system wooden structures were constructed, 566 in number, and comprising all possible combinations.

*Levee system.*—The uncompleted gaps left in the West Branch Reservation levee extending from Yuma westward toward the California mesa and protecting the Indian lands between the Colorado River and the main line of the Southern Pacific Railroad were completed, requiring the construction, in whole or in part, of 3 miles of levee and the handling of 111,920 cubic yards of earth.

*River-front protection.*—Yuma Indian Reservation: Owing to the lengthening of the meander of the Colorado River between the narrows at Yuma and Laguna Dam by some 4 miles since 1909, and



the consequent increase of the flood height by about 4 feet near the dam and by lesser heights as the river is descending, it had become necessary to raise the levees an average height of  $2\frac{1}{2}$  feet for a distance of 2.8 miles, beginning 1.3 miles below Potholes. A total of 58,666 cubic yards of earth was moved. This now leaves the top of the levee  $2\frac{1}{2}$  feet above the unusual crest of the 1914 flood. A trestle 174 feet long and containing 24,000 feet b. m. of lumber was constructed across the main canal just below the California regulator gates to reach a new quarry site. A total of 97,040 cubic yards of rock revetment was placed on the Reservation Levee during the fiscal year.

**Gila Valley:** No work was done on this branch of the levee system except that 1,440 yards of rock were placed in the Arizona sluiceway and 360 yards in Spur Dikes 2 and 3 of Arizona Levee.

**Yuma Valley:** A new levee was constructed across Nigger Bend, thus straightening the course of the Colorado River between the 12 and 17 mile posts, adding some 700 acres of irrigable lands. Permanent and standard cross-section levees were constructed to replace the numerous emergency levees constructed during previous floods; 307,178 cubic yards of earth were moved in accomplishing this. The Yuma Valley Railroad was moved to the realigned levee and the tracks carried down to the international boundary, where a wye was constructed. There are at the present time  $25\frac{1}{2}$  miles of track in Yuma Valley.

Since the reopening of the Yuma quarry in November rock has been hauled practically without interruption and all the vulnerable points protected with revetment. A total of 273,690 cubic yards of rock was thus moved during the fiscal year. These works very successfully stood the severe test to which they were subjected by one of the proverbial flashy floods of the Gila, which came down early in February and sent the Yuma gauge to 126 feet, with a discharge of 90,000 second-feet, which is about the magnitude of a more than ordinary Colorado flood.

#### DRAINAGE.

Pursuant to the report of the drainage board of September 17, 1914, work was started on the construction of open drains on the Yuma Indian Reservation, parallel to the reservation levee and leading into the main drain, which runs westward along the north of Bard town site. Contracts were let on drains A and B, each about 1 mile long and running southward and northward, respectively. The contractors, who were mostly local farmers, moved the excavation by teams down as far as the proximity of ground-water level, moving a total of 52,068 cubic yards, divided into nine schedules. In addition to this, 20,914 cubic yards were excavated by dredges and 2,044 lineal feet of cunette were constructed. Two culverts, which have provision for gates to check the drainage water and and create a back pressure against the river in case of a blow-out, and which carry irrigation canals over them, were completed. This work was ordered stopped until such time as a vote could be taken by the water users regarding the repayment of expenditures classed as supplemental construction, as required by the reclamation extension act of August 13, 1914.

## OPERATION AND MAINTENANCE.

The irrigable area of the project comprises some 128,000 acres, divided into separate units, as follows: Yuma Indian Reservation, 15,000 acres, of which 6,500 acres were opened to white settlers under public notice in 1910, the balance being divided among the Indians in 10-acre plats; Yuma Valley, 55,000 acres; Gila Valley, 18,000 acres, 8,000 of which is on the north side of the Gila River; and the mesa land, 40,000 acres.

There were constructed to June 30, 307.3 miles of main canals and laterals, as follows: Project main canal from Laguna Dam to Siphon intake, 13.5 miles; Yuma Valley, 187.1 miles; Indian Reservation, 88.3 miles, including 15.5 miles of drainage ditches; North Gila Valley, 18.4 miles. The areas in the South Gila Valley and on the mesa are not yet receiving water.

*Historical review, Yuma project.*

	1910	1911	1912	1913	1914	To June 30, 1915.
Acreage for which service was prepared to supply water.....	16,000	16,000	16,000	50,000	60,000	71,200
Acreage irrigated.....	10,000	10,000	13,767	19,607	25,207	27,000
Number of farms irrigated.....	440	447	470	616	698	725
Miles of canals operated.....	157	157	163	228	272	1 307.3
Water diverted (acre-feet).....	42,018	71,563	96,409	127,307	154,670	57,253
Water delivered to land (acre-feet).....	31,057	54,346	63,273	85,411	98,167	43,741
Acre-feet per acre to area under cultivation.....	3.10	5.43	4.60	4.36	3.69	1.62

<sup>1</sup> Constructed.

## SETTLEMENT.

Very few new settlers have moved on to the project during the last year. The Yuma Valley unit has been completed, and it is expected that the settlers will increase as soon as the hot weather is over. The prices of farm products are low at this time, but better prices are anticipated in the future.

*Settlement data, Yuma project.*

Items.	1912	1913	1914	To June 30, 1915.
Total number of farms on project (when completed).....	4,000	4,000	4,000	4,000
Population of farms reported.....	1,480	1,603	1,815	1,850
Number of farms reported.....	470	616	698	725
Number of towns.....	3	3	3	4
Population of towns.....	3,150	4,075	4,200	4,350
Total population of towns and farms.....	4,640	5,738	6,015	6,200
Number of public schools.....	13	13	14	15
Number of churches.....	6	6	7	8
Number of banks.....	3	3	3	4
Total capital stock.....				\$170,000
Total amount of deposits.....				\$1,064,200
Total number of depositors.....				2,322

**PRINCIPAL CROPS.**

The principal crops raised on the project are as follows: Alfalfa hay, alfalfa seed, milo maize, kaffir corn, feterita, wheat, and barley. Cotton has proved to be a very profitable crop, but very little was planted this year, owing to the poor market conditions. All kinds of fruit and vegetables thrive well in this locality, but, owing to the long distance to outside markets, little is raised except what is required for local consumption.

Owing to the continued decline in the price of farm products, the tendency of the farmers is to go into the cattle-feeding industry.

*Crop report, Yuma project, Arizona-California, year of 1914.*

Irrigated crop.	Area (acres).	Unit.	Yields.		Values.		
			Total.	Average per acre.	Per unit.	Total.	Per acre.
Alfalfa hay.....	10,426	Tons.....	32,525	3.12	\$6.05	\$196,716	\$18.86
Alfalfa seed.....	5,485	Pounds.....	1,246,318	227	.13	159,806	29.15
Barley.....	1,653	Bushels.....	48,964	29.6	.58	28,590	17.29
Wheat.....	570	do.....	12,710	22.3	1.00	12,783	22.43
Indian corn.....	257	do.....	8,595	33.4	.65	5,584	21.34
Corn sorghum.....	3,066	do.....	100,153	32.6	.70	70,915	23.13
Cane and corn fodder.....	551	Tons.....	993	1.8	7.45	7,397	13.42
Hay, except alfalfa.....	671	do.....	1,067	1.6	7.64	8,150	12.15
Beans.....	128	Bushels.....	2,025	15.8	2.24	4,531	35.40
Cotton.....	2,268	Pounds.....	845,044	373	.08	69,867	30.80
Cotton seed.....	2,268	Tons.....	728	.32	11.77	8,572	3.78
Fruit.....	40	.....	.....	.....	.....	4,080	102.00
Truck.....	314	.....	.....	.....	.....	18,377	58.52
Pasture.....	7,058	.....	.....	.....	.....	87,061	12.33
						126,980	12.00
Less duplicated areas.....	24,755						
	12,187						
Total cropped acreage.....	22,568	Total and average.....				709,409	31.43
Irrigated, not cropped: New land and nonbearing orchard.....	2,639	Areas.		Acres.	Farms.	Per cent of project.	
		Total irrigable farms reported....		35,685	698	22.6	
		Total irrigated area farms reported Under water-right applica- tions.....		26,207	698	15.9	
		Under rental contracts.....		19,933	263	12.6	
		Total cropped area farms re- ported.....		5,274	435	3.3	
Grand total irrigated..	25,207			22,568	698	14.3	

<sup>1</sup> Additional revenue from pasturing alfalfa and stalk lands during winter and feeding straw.

**PUBLIC NOTICE DATED MARCH 26, 1915.**

1. Under the terms of existing public notices and orders, the operation and maintenance charges for the Yuma project, Arizona, become due on December 1 of each year, in advance.

2. In pursuance of the provisions of the reclamation act of June 17, 1902 (32 Stat., 388), and acts amendatory thereof and supplemental thereto, and in particular the reclamation extension act of August 13, 1914 (38 Stat., 686), section 6 of which authorizes the Secretary of the Interior to fix the due date for operation and maintenance charges, notice is hereby given that the operation and maintenance charge for the said project, which under existing public notices became due

December 1, 1914, is postponed to and shall become due on March 1, 1916, and all operation and maintenance charges hereafter made against lands under the said project shall become due on March 1 of each year thereafter until further notice.

3. Hereafter no operation and maintenance charge shall be collected at the time water-right application is filed, but the first payment on account of operation and maintenance shall become due on March 1 of the year following the calendar year in which entry or water-right application was made: *Provided, however,* That if original entry or original water-right application be filed after October 1 in any year, the first payment on account of operation and maintenance will not become due until March 1 of the second calendar year following the date of entry.

4. The discount for payment made on or before the due date and the penalties for failure to make payment before the first day of the third calendar month after the due date will be applied as provided in section 6 of the said reclamation extension act.

5. The operation and maintenance charge for the irrigation season of 1915 shall be due March 1, 1916, and each acre of irrigable land, whether irrigated or not, shall be charged with a minimum operation and maintenance charge of 75 cents, which will permit delivery of not more than 1 acre-foot per acre. Should further quantities be needed, they will be furnished at the rate of 75 cents per acre-foot.

6. The provisions of this public notice shall apply to all lands subject to public notice heretofore issued for the said project.

7. Except as hereinabove provided, all the terms and provisions of existing public notices and orders for the Yuma project shall remain unchanged.

A. A. JONES,  
*First Assistant Secretary.*

#### FINANCIAL STATEMENTS.

*Assets, liabilities, reserves, and capital, Yuma project, to June 30, 1915.*

##### ASSETS.

##### Accounts receivable:

Construction charges due and uncollected from water-right applicants.....	\$68,652.47
Construction charges unaccrued on contracts with water-right applicants.....	441,113.58
Operation and maintenance charges due and uncollected from water-right applicants.....	18,216.00
Uncollected water rentals.....	6,469.25
Uncollected freight refunds.....	.25
Uncollected miscellaneous items.....	93.74

Total..... \$534,545.29

##### Inventories:

Mercantile store stock on hand.....	239.11
Animals.....	8,000.00
Mechanical and other equipment.....	170,660.96
Material and supplies on hand in storehouses.....	103,005.89
Unadjusted transfers between projects.....	264.49
Undistributed cost (freight and handling).....	4,875.02

Total..... 287,045.47

## Construction work in process:

Gross expenditures for construction of project to date.....	\$7, 936, 090. 46	
Less revenues earned during construction, as follows:		
Rentals of buildings and equipment.....	\$2, 874. 25	
Rental of irrigating water.....	241, 459. 30	
Contractors' freight refunds.....	18, 506. 11	
Profits on mess houses.....	1, 607. 04	
Profits on mercantile stores.....	66, 335. 30	
Adjustments—		
Depreciation on plant and equipment.....	15, 272. 75	
	<u>346, 054. 75</u>	
Less loss on operation of Yuma Valley Railroad.....	2, 279. 64	
Total deductions.....	<u>343, 775. 11</u>	
Net expenditures for construction of project to date .....	\$7, 592, 315. 35	
Deferred operation and maintenance charges.....	76, 286. 37	
Total assets.....	<u>8, 490, 192. 48</u>	
<b>LIABILITIES, RESERVES, AND CAPITAL.</b>		
Accounts payable:		
Unpaid labor.....	\$14, 925. 98	
Unpaid purchases.....	25, 022. 32	
Unpaid freight and express.....	41, 172. 21	
Unpaid passenger fares.....	444. 40	
Unpaid right of way agreements.....	1, 658. 50	
Unredeemed coupon books.....	383. 50	
Unredeemed meal tickets.....	913. 60	
Unpaid miscellaneous.....	1, 109. 75	
Total .....		85, 630. 26
Reserves for repayment to reclamation fund of cost of project:		
Value of construction contracts with water-right applicants.....	724, 913. 64	
Construction charges paid and forfeited by water-right applicants.....	754. 00	
Penalties on construction charges paid by water-right applicants.....	40. 66	
Total .....		725, 708. 30
Net investment:		
Disbursements.....	\$8, 186, 033. 32	
Transfers received from other projects.....	216, 302. 65	
	<u>8, 402, 335. 97</u>	
Collections.....	630, 260. 12	
Transfers issued to other projects...	93, 221. 93	
	<u>723, 482. 05</u>	
Cost-ledger inventories.....		7, 678, 853. 92
Total liabilities, reserves, and capital investment of the Government.....		<u>8, 490, 192. 48</u>

*Functional feature costs, Yuma project, to June 30, 1915.*

Examination and surveys.....	\$167, 332. 99
Canal system.....	3, 454, 079. 21
Lateral system.....	1, 465, 951. 27
Drainage system.....	144, 356. 73
Flood protection system.....	2, 035, 310. 96
Farm units.....	28, 075. 94
Permanent structures and land.....	140, 203. 17
Telephone system.....	9, 844. 68
Operation and maintenance during construction.....	489, 219. 51
Stores and other operations.....	1, 716. 00
Gross expenditures for construction of project to date.....	<u>7, 936, 090. 46</u>

*Operating revenues and expenses, Yuma project, to June 30, 1915.***EXPENSES.**

Development (diversion) works—	
Operation.....	\$3, 693. 82
Maintenance.....	39, 320. 89
Canal and lateral system—	
Operation (white lands).....	27, 609. 06
Operation (Indian lands).....	2, 661. 41
Maintenance (white lands).....	59, 555. 62
Maintenance (Indian lands).....	1, 450. 93
Drainage system—	
Operation.....	4, 820. 06
Maintenance.....	776. 39
General expense (unapportioned).....	1, 592. 38
Total.....	<u>141, 480. 56</u>

**REVENUES.**

Operation and maintenance charges accrued on contracts with water-right applications.....	62, 301. 38
Operation and maintenance charges paid in advance by water-right applicants.....	9. 17
Operation and maintenance charges paid and forfeited by water-right applicants.....	251. 00
Rentals of lands and buildings.....	2, 632. 64
Deferred operation and maintenance revenues (carried to debit side of assets and liabilities statement).....	76, 286. 37
Total.....	<u>141, 480. 56</u>

*Estimated cost of contemplated work, Yuma project, during fiscal year 1916.*

Examinations and surveys.....	\$6, 150. 00
Lateral system.....	15, 340. 00
Drainage system.....	61, 000. 00
Flood protection.....	270, 675. 00
Telephone system.....	615. 00
Operation and maintenance:	
During construction.....	\$92, 700. 00
Under public notice.....	37, 600. 00
Plant and equipment.....	16, 850. 00
Total.....	147, 150. 00
Stores and other operations:	
Reimbursable accounts.....	88, 000. 00
Unallotted to features.....	71, 070. 00
Total.....	<u>660, 000. 00</u>

## CALIFORNIA, COOPERATIVE WORK.

*Lower Pit River project.*—An agreement between the United States and the Northern California Irrigation Association, of Redding, Cal., dated September 10, 1914, provided for surveys and investigations to be made by the United States of irrigation possibilities in and in the vicinity of Shasta County, Cal. The expense of the work was not to exceed \$5,000, and equal shares of the amount to be expended were to be provided by the United States and the association.

Work in the field was commenced in the spring of 1915 and practically completed prior to the end of June. A feasible dam site was located on the Pit River a few miles north of the mouth of the McCloud, and a canal system to water 55,000 acres has been designed. Much attention has been given to the character of the irrigable lands, principally to determine soil conditions and values. The final report will be completed during July, 1915.

*Investigations in Lassen County, Cal.*—An agreement between the United States and the Southern Lassen Irrigation Association, of Lassen County, Cal., dated March 18, 1915, provides for investigations and surveys to be made by the United States Reclamation Service to determine irrigation possibilities in the vicinity of Honey Lake, Lassen County. The expense of the work was not to exceed \$5,000, an equal share of which was to be borne by each party to the agreement. Field work was commenced in April and completed in June, 1915. The principal work consisted of locating and determining the capacities of various sources of supply. The chief source appears to be in Eagle Lake. Works for controlling the supply and a canal system to irrigate 25,000 acres of land have been designed. The final report will be made in July, 1915.

*Investigations in Pit River Basin.*—An agreement between the United States and the State of California, dated May 27, 1914, provided for a total expenditure not exceeding \$5,000 on surveys and investigations within the Pit River drainage area to determine the feasibility of constructing reservoirs and other works necessary or desirable for the full utilization of the waters of the Pit River and its tributaries in improving navigation of the Sacramento River and to determine the most advantageous utilization of the public land, reservoir sites, waters, and other resources of the State and Nation for irrigation and other public uses. Field work was commenced July 25, 1914, and completed in March, 1915. The final report was completed and in the hands of the State printer at the end of June, 1915. One thousand copies of the report are to be printed, and it is expected they will be issued toward the end of September, 1915.

*Investigations of Iron Canyon project.*—An agreement between the United States and the Iron Canyon Project Association of California, dated October 6, 1913, provided for investigations and surveys for the Iron Canyon project in the northern part of the Sacramento Valley. The project contemplates the construction of a reservoir on the Sacramento River a few miles above Red Bluff and the irrigation of 225,000

acres of land in Tehama, Colusa, and Glenn Counties. A large power plant at the dam and the regulation of floods of the river are incidental to the plan. Surveys began in 1913 and were completed in August, 1914. A report was made in November, 1914, and a board of review appointed by the Secretary of the Interior considered this report and made definite recommendations to the Secretary of the Interior on November 12, 1914. One thousand copies of the report have been printed, of which the larger portion have been issued to the local public through the Iron Canyon Project Association. The total expense incurred in this work was limited by the contract to \$20,000, of which one half was provided by each of the parties to the agreement.

### FINANCIAL STATEMENT.

*Assets, liabilities, reserves, and capital, Iron Canyon cooperative work, to June 30, 1915.*

#### ASSETS.

Accounts receivable:		
Miscellaneous, Iron Canyon Project Association.....	\$113.28	
Inventories:		
Equipment.....	200.00	
Building work in progress:		
Gross building expenses.....	\$9,464.07	
Adjustments.....	None.	
	<hr/>	9,464.07
Total assets.....		<hr/> <hr/> 9,777.33

#### LIABILITIES, RESERVES, AND CAPITAL.

Net investment:		
Disbursements.....	15,164.42	
Transfers received.....	4,198.30	
	<hr/>	19,362.72
Less—		
Collections.....	\$9,044.43	
Transfers issued.....	540.96	
	<hr/>	9,585.39
Total liabilities and investment.....		<hr/> <hr/> 9,777.33

*Functional feature costs, Iron Canyon cooperative work, to June 30, 1915.*

Examination and surveys..... \$9,464.07

*Assets, liabilities, reserves, and capital, Pit River cooperative work, to June 30, 1915.*

#### ASSETS.

Building work in progress:		
Gross building expenses.....	\$2,468.93	
Deductions.....	None.	
Total assets.....	<hr/>	\$2,468.93

#### LIABILITIES, RESERVES, AND CAPITAL.

Accounts payable:		
Unpaid labor.....	70.00	
Net investment:		
Disbursements.....	2,157.92	
Transfers received.....	241.01	
	<hr/>	2,398.93
Total liabilities and investment.....		<hr/> <hr/> 2,468.93



*Functional feature costs, Pit River cooperative work, to June 30, 1915.*

Examination and surveys..... \$2,468.93

*Assets, liabilities, reserves, and capital, Shasta County cooperative work, to June 30, 1915.*

## ASSETS.

## Building work in progress:

Gross building expenses..... \$1,880.14

Less advance payment made by Northern California Irrigation  
Association..... 219.87

Total assets..... 1,660.27

## LIABILITIES, RESERVES, AND CAPITAL.

## Accounts payable:

Unpaid labor..... \$1,368.77

Unpaid purchases..... 153.20

Unpaid passenger fares..... 97.85

1,619.82

## Net investment:

Disbursements..... 2,135.57

Transfers received..... 4.88

2,140.45

Less collections..... 2,100.00

40.45

Total liabilities and investment..... 1,660.27

*Functional feature costs, Shasta County cooperative work, to June 30, 1915.*

Examination and surveys..... \$1,880.14

*Assets, liabilities, reserves, and capital, Lassen County cooperative work, to June 30, 1915.*

## ASSETS.

## Accounts receivable:

Uncollected miscellaneous, Southern Lassen Irrigation Association.... \$551.27

## Building work in progress:

Gross building expenses..... 1,051.28

Total assets..... 1,602.55

## LIABILITIES, RESERVES, AND CAPITAL.

## Accounts payable:

Unpaid labor..... 264.00

Unpaid purchases..... 1.30

Unpaid passenger fares..... 94.10

341.40

## Net investment:

Disbursements..... 1,714.43

Transfers received..... 46.72

1,761.15

Less collections..... 500.00

1,261.15

Total liabilities and investment..... 1,602.55

*Functional feature costs, Lassen County cooperative work, to June 30, 1915.*

Examination and surveys..... \$1,051.28

## **CALIFORNIA, ORLAND PROJECT.**

A. N. BURCH, project manager, Orland, Cal.

### **LOCATION.**

Counties: Glenn and Tehama; reservoir and storage feed canal in Colusa County.

Townships: 21 to 23 N., Rs. 2 to 4 W., Mount Diablo meridian.

Railroads and other transportation lines: Southern Pacific Railroad and steamers on Sacramento River.

Railroad station and estimated population January 1, 1915: Orland, 1,500; railroad flag stations with freight sidetracks, Greenwood, Wyo., and Malton.

### **WATER SUPPLY.**

Source of water supply: Stony Creek.

Area of drainage basin: Above project diversion dam, 735 square miles; above feed canal diversion dam, 97 square miles; above East Park Dam (Little Stony), 102 square miles.

Annual run-off in acre-feet: Stony Creek, near Fruto (601 square miles), 1907 to 1913—maximum, 940,000; minimum, 135,200; mean, 500,000. Little Stony Creek, at East Park Dam (102 square miles), 1907 to 1914—maximum, 170,800; minimum, 12,600; mean, 73,000.

### **AGRICULTURAL AND CLIMATIC CONDITIONS.**

Area for which the service is prepared to supply water, season of 1915: 20,300 acres.

Area under rental contracts, season of 1915: 9,000 acres.

Length of irrigating season: From April 1 to October 31—214 days.

Average elevation of irrigable area: 250 feet above sea level.

Average annual rainfall on irrigable area: 1883 to 1915, 17 inches; 1914, 21.55 inches.

Range of temperature on irrigable area: 26° to 114° F.

Character of soil of irrigable area: Sandy and gravelly loam, silt loam.

Principal products: Alfalfa, citrus and other fruits, and vegetables.

Principal markets: San Francisco, Cal.; Portland, Oreg.; eastern markets.

### **LANDS OPENED FOR IRRIGATION.**

No lands have been opened for irrigation by public notice. All lands are being irrigated under rental contracts.

### **CHRONOLOGICAL SUMMARY.**

Reconnaissance and preliminary surveys made in 1906.

Construction recommended by board of engineers November 12, 1906.

Construction authorized by Secretary October 5, 1907.

First irrigation by Reclamation Service, season of 1910.

East Park Dam completed July, 1910.

Construction of East Park Feed Canal and second unit of the project authorized by Secretary July 25, 1913.

East Park Feed Canal completed June 30, 1915.

Entire project 90 per cent completed June 30, 1915.

### **IRRIGATION PLAN.**

The irrigation plan of the Orland project provides for the storage of water in a reservoir controlled by East Park Dam on Little Stony Creek, about 40 miles southwest of Orland, Cal., and a feed canal 7 miles long connecting the storage basin with Stony

Creek. The diversion works for the feed canal are located about  $3\frac{1}{4}$  miles west of Stonyford. For the irrigation of lands in the vicinity of Orland water is diverted from Stony Creek into the canal systems at two points—namely, Miller Buttes,  $9\frac{1}{2}$  miles northwest of Orland, for the South Canal system, and at the north side weir, 5 miles northwest of Orland, for the North Side Canal system. The South Canal system is to irrigate 13,000 acres on the south side and the North Canal system 7,000 acres on the north side of Stony Creek. The stored water is conveyed from East Park in the natural creek channel 41 miles to the Miller Buttes diversion and 45 miles to the north side weir, where it is taken out in distribution systems comprising 138 miles of canals and laterals. The plan also includes a high-line canal from which power may be developed for pumping. The United States intends, for and in connection with the project, to use the waste, seepage, spring, and percolating water arising within the same, and asserts a right thereto by virtue of its reservation of all unappropriated waters of the project source of supply and of its appropriation of said waters in accordance with the State law heretofore made for the purposes of the project.

Work now under way includes the completion of the diversion weir at Miller Buttes, raising the banks on sections of the canal above the high-line chute, and altering canal structures to provide for irrigating the 5,000 acres taken in on the south side of Stony Creek under the extension, and the placing of 58,000 square yards of concrete lining in the lateral system.

The present limits of the Orland project may be considered as a unit of the Sacramento Valley project. It may be extended by constructing additional reservoirs on Stony Creek and its tributaries. The chief additional reservoir sites available are Millsite, on Stony Creek, near Fruto; Briscoe, on Briscoe Creek, near Elk Creek; Stonyford, on Stony Creek, at Stonyford; and Stony Gorge, on Stony Creek, near Elk Creek.

#### CONSTRUCTION DURING FISCAL YEAR.

The following construction work was done during the year 1914:

Canal lining.....	square yards..	96, 670
Paving.....	do.....	543
Riprap.....	cubic yards..	229
Farm and lateral turnouts.....		197
Checks and drops.....		207
Timber deck and pipe bridges.....		69
Concrete highway bridges.....		2
Spillways.....		6
Special structures.....		6
Culverts.....		42
Pipe lines.....		6
Feed Canal Diversion Dam and structures.....		20

#### *Product of pipe yard, fiscal year 1915.*

12-inch.....	linear feet..	1, 166
18-inch.....	do.....	788
24-inch.....	do.....	1, 758

#### *Excavation, fiscal year 1915.*

East Park feed canal.....	cubic yards..	127, 695
Distribution system.....	do.....	106, 080
Total.....		233, 775

#### OPERATION AND MAINTENANCE.

The irrigation works operated in 1914 included the East Park Reservoir and the North and South Canal headworks, together with 23 miles of canals with capacities of 50 to 150 second-feet and 70 miles of laterals with capacities of 10 to 45 second-feet. There were 138 miles of natural and artificial channels in use, and 1,235 structures of various types and dimensions.

*Historical review, Orland project.*

Item.	1911	1912	1913	1914	1915 <sup>1</sup>
Acres for which service was prepared to supply water.....	14,000	14,200	14,300	14,300	20,300
Acres irrigated.....	2,663	4,230	6,617	7,354	9,000
Miles of canal operated.....	64	88	91	93	110
Water stored (acre-feet).....	47,000	25,000	14,800	45,600	48,300
Water diverted (acre-feet).....	39,200	34,000	40,500	50,000	60,000
Water delivered to land (acre-feet).....	10,335	16,702	19,850	30,000	36,000
Per acre of land irrigated (acre-feet).....	3.9	3.97	3.00	4.08	4.00

<sup>1</sup> Estimated.**SETTLEMENT AND DEVELOPMENT.**

Fairly satisfactory progress was made in project development, although not so much new land was brought under cultivation as was anticipated at the beginning of the year. Although during the last half of the year it was almost impossible to get money for farm improvements, work was being done on 22 new farms at the close of the year in preparation for the coming season. About \$84,000 were put into buildings and other farm improvements during the year.

The market for hay was inactive throughout the year, and the prices paid for what was disposed of were so low as not to cover the cost of production. This, together with the fact that it was impossible for the farmers to borrow money for the purchase of stock for feeding or other purposes, worked a great hardship on those who were depending entirely on their hay crop or who had a few head of stock and were depending on disposing of their surplus hay and increasing their herds.

Water-rental charges for the season were paid through the Water Users' Association and turned over to the United States in a lump sum on July 15. The assessment levied by the association amounted to \$2 per acre for all of the irrigable land of the project.

There was more activity in land sales than for the previous year, with little change in the average price for unimproved land. The average holding for all of the irrigable land of the project is 44 acres, and for the land included in the 1914 crop report 29.2 acres. For the latter the irrigated area averaged 24.8 acres.

*Settlement data, Orland project.*

Item.	1912	1913	1914	1915
Total number of farms on the project.....	350	350	507	509
Population.....	700	950	1,100	1,600
Number of irrigated farms.....	211	246	277	350
Operated by owners.....	193	226	244	300
Operated by tenants.....	18	20	33	50
Population.....	645	896	1,000	1,500
Number of towns.....	1	1	1	1
Population.....	1,200	1,300	1,350	1,500
Total population.....	1,900	2,250	2,450	3,100
Number of public schools.....	5	6	8	8
Number of churches.....	4	5	5	6
Number of banks.....	1	2	2	2
Total capital stock.....	\$55,000	\$110,000	\$110,000	\$141,000
Total amount of deposits.....			\$391,000	\$396,000
Total number of depositors.....			1,223	1,708

## PRINCIPAL CROPS.

Of the total area cropped, 5,817 acres were in alfalfa—an increase of 733 acres over the previous year. The balance of the cropped area was in miscellaneous crops, principally fruits, nuts, and garden.

The yield of alfalfa hay was 28,539 tons, an increase of 13,215 tons over 1913. The estimated value of the crop was \$119,863, which, owing to the exceedingly low market price on which the estimate was based, is nearly \$50,000 less than the value of the 1913 crop. As about 80 per cent of the crop was consumed on the project in feeding dairy and other stock the market price of the hay does not represent its true value to the farmers as a whole.

There were 287 acres of fruit of various kinds in full or partial bearing, for which the acreage yield was about the same as last year, but the prices received were less. A few small groves of almonds came into bearing for the first time, some trees yielding as high as as \$1.50 each. The average return from 4 and 5 year old trees was about \$30 per acre. The maximum returns from a full-bearing grove were \$200 per acre.

The stock yield report shows an increase, with the exception of beef cattle and poultry. Dairy stock shows an increased value of \$70,835 and an increase in number of 1,165, or about 85 per cent.

*Crop report, Orland project, California, year of 1914.*

Irrigated crop.	Area (acres).	Unit.	Yields.		Values.		
			Total.	Average per acre.	Per unit.	Total.	Per acre.
Alfalfa hay, old.....	4,895	Tons.....	27,315	5.6	\$4.20	\$114,723	\$23.43
Alfalfa hay, new.....	922	do.....	1,224	1.3	4.20	5,140	5.57
Alfalfa pasture.....	4,009					12,645	3.06
Corn, sorghum.....	146	Bushels.....	5,794	39.6	.83	4,795	32.94
Fruit, small.....	22					2,974	135.22
Fruit, deciduous <sup>1</sup> .....	88	Pounds.....	216,000	2,455	.0193	4,165	47.33
Fruit, citrus.....	87	do <sup>2</sup> .....	766,500	882	.0170	13,030	149.77
Almonds.....	90	do.....	65,000	721	.168	10,922	121.35
Nursery.....	3					1,310	436.66
Garden.....	72					6,627	92.04
Less duplicated areas.....	3,894						
<b>Total cropped acreage..</b>	<b>6,540</b>	<b>Total and average.....</b>				<b>176,331</b>	<b>26.96</b>
			Areas.		Acres.	Farms.	Per cent of project.
Irrigated, not cropped:							
Nonbearing orchard.....	630	Total irrigable area farms reported.....			8,638	296	42.7
Miscellaneous.....	184	Total irrigated area farms reported.....			7,354	296	36.4
		Under rental contracts.....			7,194	294	35.1
		Vested rights.....			160	2	.8
<b>Grand total irrigated...</b>	<b>7,354</b>	<b>Total cropped area farms reported.....</b>			<b>6,540</b>	<b>296</b>	<b>32.3</b>

<sup>1</sup> Apples, peaches, pears, prunes, apricots.

<sup>2</sup> Approximately 10,200 boxes.

## FINANCIAL STATEMENTS.

*Assets, liabilities, reserves, and capital, Orland project, to June 30, 1915.*

Accounts receivable:		
Uncollected miscellaneous items.....		\$353.07
Inventories:		
Animals.....	\$355.00	
Mechanical and other equipment.....	9,063.30	
Material and supplies on hand in storehouses.....	12,405.91	
		<hr/>
Total.....		21,844.21
Construction work in process:		
Gross expenditures for construction of project to date....	895,349.99	
Less revenues earned during construction, as follows:		
Rentals of cottages.....	\$864.00	
Rentals of grazing lands.....	3,016.00	
Rentals of irrigation water.....	95,416.60	
Contractors' freight refunds.....	1,369.41	
Forfeitures by default—bidders and contractors.....	2,115.00	
Miscellaneous revenues.....	1,712.94	
Profit on mess houses.....	14.97	
Loss on mercantile stores.....	<sup>1</sup> 6.51	
Profits on hospitals.....	691.58	
Adjustment—		
Depreciation on plant and equipment.....	575.64	
Loss on Government animals.....	<sup>1</sup> 7.93	
		<hr/>
Total deductions.....		105,761.70
		<hr/>
Net expenditures for construction of project to date.....		789,588.29
		<hr/>
Total assets.....		811,785.57
		<hr/>

## LIABILITIES, RESERVES, AND CAPITAL.

Accounts payable:		
Unpaid labor.....	\$9,682.72	
Unpaid purchases.....	9,063.22	
Unpaid freight and express charges.....	4,526.86	
Unpaid passenger fares.....	56.25	
Unpaid agreements to purchase real estate.....	37.50	
Unpaid miscellaneous.....	458.00	
		<hr/>
Total.....		23,824.55
Net investment:		
Disbursements.....	\$858,313.33	
Transfers received from other projects.....	43,642.72	
		<hr/>
		901,956.05
Collections.....	109,007.43	
Transfers issued to other projects.....	4,987.60	
		<hr/>
		113,995.03
		<hr/>
Total.....		787,961.02
		<hr/>
Total liabilities, reserves, and capital investment of the Government.....		811,785.57

<sup>1</sup> Deduct.

*Functional feature costs of Orland project to June 30, 1915.*

Examination and survey .....	\$3, 770. 20
Storage system.....	452, 848. 80
Canal system.....	143, 531. 34
Lateral system.....	201, 217. 65
Farm units.....	1, 038. 01
Permanent improvements and land.....	14, 047. 50
Operation and maintenance during construction.....	78, 896. 49

Gross expenditures for construction of project to date..... 895, 349. 99

*Estimated cost of contemplated work, Orland project, during fiscal year 1916.*

Examination and surveys.....	\$340. 00
Canal system.....	20, 866. 00
Lateral system.....	16, 691. 00
Drainage system.....	578. 00
Flood protection.....	500. 00
Farm units.....	75. 00
Permanent improvements and land.....	95. 00
Operation and maintenance.....	21, 600. 00
Stores and other operation:	
Reimbursable accounts.....	600. 00
Unallotted to features.....	8, 655. 00
Total.....	70, 000. 00

## **COLORADO, GRAND VALLEY PROJECT.**

J. H. MINER, project manager, Grand Junction, Colo.

### **LOCATION.**

County: Mesa.

Townships: 1 N., Rs. 1 E. and 1 to 3 W.; 2 N., Rs. 2 and 3 W.; 1 S., Rs. 1 E. and 1 W., Ute meridian. 9 S., Rs. 101 to 104 W.; 10 S., Rs. 98, 101, and 103 W.; 11 S., Rs. 98 and 99 W., sixth principal meridian.

Railroads: Denver & Rio Grande; Colorado Midland.

Railroad stations and estimated population, January 1, 1915: Palisade, 1,000; Clifton, 165; Grand Junction, 8,250; Fruita, 700; Loma, 70; Mack, 40.

### **WATER SUPPLY.**

Source of water supply: Grand River.

Area of drainage basin: 8,550 square miles above Palisade.

Annual run-off in acre-feet of Grand River, at Palisade, 1897 to 1899 and 1902 to 1914: Maximum, 5,230,000 (1912); minimum, 2,300,000; mean, 3,827,000.

Discharge in second-foot of Grand River, at Palisade, 1902 to 1914: Maximum, 43,400; minimum, 1,102.

### **AGRICULTURAL AND CLIMATIC CONDITIONS.**

Length of irrigation season: From April 1 to October 31, 214 days.

Average elevation of irrigable area: 4,700 feet above sea level.

Average annual rainfall on irrigable area: For 22 years, 8.30 inches; 1914, 9.79 inches.

Range of temperature on irrigable area:  $-15^{\circ}$  to  $100^{\circ}$  F.

Character of soil of irrigable area: Sandy loam, sandy mesas, and adobe.

Principal products: Fruit, sugar beets, alfalfa, grain, vegetables.

Principal markets: Large cities east of Rocky Mountains for fruit; other products, local.

### **CHRONOLOGICAL SUMMARY.**

Reconnaissance and preliminary surveys begun in September, 1902.

Construction recommended by board of engineers December 15, 1908.

Purchase of rights of way authorized by Secretary November 4, 1911.

Construction authorized by Secretary September 23, 1912.

Entire project 54 per cent completed June 30, 1915.

### **IRRIGATION PLAN.**

The irrigation plan of the Grand Valley project provides for the diversion of water from the Grand River by a dam to be located about 8 miles northeast of Palisade, Colo., into a canal system on the north side of the river, for the irrigation of lands lying north and west of Grand Junction, Fruita, and Mack, Colo. About 42,750 acres will be supplied by gravity and 10,250 acres by electrically-operated pumping plants to be located on the gravity canal. The United States claims all waste, seepage, spring, and percolating water arising within the project and proposes to use such water in connection therewith. On the first 6 miles of the main canal, located in the canyon of the Grand River, there are 3 tunnels, respectively 3,723, 1,655, and 7,292 feet long.

On June 30, 1915, the diversion dam and headworks were 95 per cent complete, and the earthwork, tunnels, and structures on the canal through the canyon were complete, with the exception of the wasteway at station 242. The earthwork and structures on the next 30 miles of main canal were 99 per cent complete. On the following 10 miles the earthwork was 61 per cent complete and work had been started on the structures. Laterals to serve the 15,000 acres in the first lateral district were 67 per cent complete.

There remain to be completed the last 16 miles of the main canal, laterals for the second and third lateral districts, the power plant and pumping system, and such drainage works as may be required.



## CONSTRUCTION DURING FISCAL YEAR.

*Grand River Dam.*—The high-water flow of 1914 continued exceptionally late in the year and necessitated postponing until the latter part of August the completion of the main cofferdam and the diversion of the whole flow of the river through the completed sluiceway. In September excavation of the foundation for the main weir was undertaken, using teams in the west part and a drag-line outfit in the east. On October 3, 1914, heavy rainstorms caused a flood of 15,600 second-feet, exceeding by 50 per cent the maximum of any similar flood that has occurred in the preceding 18 years. This overtopped the cofferdam and washed out about 100 feet of its length. The flood deposited some silt in the excavations, and also washed away some material that would otherwise have had to be moved by team. The resultant net damage was slight. In the excavation of the foundations water "piped through" under the cofferdams, requiring a large amount of pumping. Excavation for the cut-off walls was carried either into firm cemented gravel or to the underlying shale. Placing of concrete in weir and piers was begun late in October and continued through the fiscal year. During this period 12,657 cubic yards were placed, completing the concrete work in the structure except for the walls of the hoist houses and power house and a warped wall for the protection of the east abutment. During the year 39,500 cubic yards of material, mostly gravel, were excavated. Four thousand seven hundred and fifty-one cubic yards of riprap, including the quantity required for the protection of the railroad embankment, were quarried and placed.

The European war led to the cancellation of the contract with the German patentees for the manufacture of the roller crests, except that the foreign firm was still obligated to furnish the hoisting chains. The rollers were redesigned in American shapes, bids invited, and contract entered into with the Riter-Conley Co. on November 27, 1914. The first roller was shipped on February 10, and the others followed at intervals of about one week. The hoists for operating the rollers and the steel arch foot bridges to connect the piers were purchased under separate contracts. The erection of the rollers and foot bridges by Government forces was completed by June 26. Meanwhile the contractors became extremely delinquent in the delivery of the chains, and the order therefor was canceled and advertisement issued soliciting proposals July 12, 1915. The head gates of the main canal were formally raised on June 29, 1915, by Chairman Fitzgerald of the Committee on Appropriations, House of Representatives.

*Main canal, canyon division.*—The canal excavation on this division has been performed by contract and all tunnels and structures have been constructed by Government forces. The earthwork contract was completed on July 21, 1914. The excavation of Tunnel No. 3 was continued in all four headings. In headings Nos. 1 and 2 two shifts per day were worked until August 7, 1914, and three shifts per day from this date until September 25, 1914, when these two headings were holed through. The material excavated consisted of earth and sandstone boulders. Headings Nos. 3 and 4 were excavated with two shifts daily until September 28, 1914, and September 8, 1914, respectively, after which dates the work was prosecuted with

three shifts daily until the headings were holed through (November 18, 1914). The material excavated in these headings consisted of a hard, gritty shale. After June 30, 1914, the advance in each of the four headings was as follows: Heading No. 1, 603 feet; heading No. 2, 667 feet; heading No. 3, 975 feet; heading No. 4, 853 feet; total, 3,098 feet.

In August, 1914, the installation, at the upper portal of Tunnel No. 3, of a camp and concrete plant for use in concreting Tunnels Nos. 2 and 3 was completed. The concreting of Tunnel No. 2 was started September 4, 1914, and completed November 28, 1914. One thousand six hundred and fifty-five linear feet of tunnel, 14 feet by 16 feet in section, were lined and the two portals concreted, involving the placing of 4,374 cubic yards of concrete. The concreting of Tunnel No. 3 was started on October 7, 1914, and completed on February 24, 1915. Thirteen thousand nine hundred cubic yards of concrete were placed in the 7,292 linear feet of tunnel and the lower portal. Concreting of the upper portal was deferred until construction of the wasteway at this point is taken up.

The permanent bridge to carry the tracks of the Rio Grande Junction Railway over the main canal at station 23 was completed in November, 1914. The wasteway at station 22 was finished in June, 1915. These structures involved the placing of 1,631 cubic yards of concrete, 406 cubic yards of paving, and the erection of 77,000 pounds of structural steel.

The seasoning and priming of this division of the canal was begun in June, 1915.

*Main canal, divisions 2, 3, and 4.*—Work on canal excavation on these divisions has been performed by contract and on structures by Government forces. The contractor for the first 30 miles began work July 23, 1914. The total yardage moved during the fiscal year was 1,773,560, and on June 30, 1915, the contract was 99.2 per cent complete. Bids for the next 10 miles were opened March 10, 1915, and work started on April 1, 1915. At the end of the fiscal year the contractors had moved 255,600 cubic yards of material, and the contract work was 61 per cent complete.

The following structures were completed by Government forces: 27 highway bridges, 53 vitrified-pipe culverts, 20 corrugated-iron culverts, 4 reinforced-concrete culverts, 4 double No. 252 metal flumes, 2 concrete siphons, and 3 wasteways. On June 30, 1915, the structures on the first 30 miles of divisions 2, 3, and 4 were 98 per cent complete and on the next 10 miles 3 per cent complete.

*Laterals.*—In the first lateral district contract was executed on April 3, 1915, for earthwork on 80 miles of laterals. On June 30, 1915, the contractors had excavated 99,000 cubic yards of material and the contract was 56 per cent complete. Government forces completed 33 lateral head gates and 600 bridges, drops, chutes, turnouts, and other minor structures. This work was 76 per cent complete at the end of the fiscal year. In the second lateral district location surveys were in progress and advertisement was issued for the excavation of 20 miles of laterals, bids to be opened July 1, 1915.

#### OPERATION AND MAINTENANCE.

No water has been diverted for irrigation.

**SETTLEMENT.**

No material progress has been made, as the canal system has not been so far completed as to provide for the delivery of water.

**FINANCIAL STATEMENTS.**

*Assets, liabilities, reserves, and capital, Grand Valley project, to June 30, 1915.*

**ASSETS.**

Cash in fiscal agent's possession awaiting remittance.....	\$24. 35	
Accounts receivable, uncollected rentals of farming lands.....	20. 00	
Inventories:		
Mercantile stores, stock on hand.....	\$142. 17	
Animals.....	5, 002. 00	
Mechanical and other equipment.....	4, 910. 00	
Material and supplies on hand in storehouses.....	31, 420. 77	
Goods in transit.....	646. 42	
Unadjusted transfers between projects.....	<u>13, 635. 26</u>	
Total.....		38, 486. 10
Construction work contracted:		
Unearned value of construction work contracted.....		60, 978. 30
Construction work in process:		
Gross expenditures for construction of project to date.....	\$2, 482, 073. 17	
Less revenue earned during construction—		
Rentals of buildings.....	\$1, 008. 43	
Rentals of farming lands.....	1, 471. 74	
Rentals of power and light.....	233. 93	
Rentals of irrigation water.....	15. 00	
Rentals of telephones.....	15. 65	
Forfeitures by defaulting bidders and contractors.....	20. 00	
Profit on messhouses.....	12, 043. 16	
Profit on mercantile stores.....	1, 172. 98	
Profit on hospital.....	<u>4, 182. 28</u>	
Total deductions.....		<u>20, 163. 17</u>
Net expenditures for construction of project to date.....		2, 461, 910. 00
Total assets.....		<u>2, 561, 418. 75</u>

**LIABILITIES, RESERVES, AND CAPITAL.**

Accounts payable:		
Unpaid progress earnings under construction contracts.....	\$36, 637. 36	
Unpaid contract holdbacks.....	45, 646. 42	
Unpaid labor.....	19, 322. 21	
Unpaid purchases.....	10, 594. 13	
Unpaid freight and express.....	28, 243. 53	
Unpaid passenger fares.....	204. 72	
Unpaid agreements to purchase real estate.....	<u>541. 00</u>	
Total.....		\$141, 189. 37
Contingent obligations:		
Unearned value of construction work contracted.....		60, 978. 37
Net investment:		
Disbursements.....	\$2, 266, 415. 63	
Transfers received from other projects.....	<u>103, 903. 95</u>	
Less—		\$2, 370, 319. 58
Collections.....	7, 375. 04	
Transfers issued to other projects.....	<u>3, 693. 46</u>	
Total.....		<u>11, 068. 50</u>
Total.....		2, 359, 251. 08
Total liabilities, reserves, and capital investment of the Government.....		<u>2, 561, 418. 75</u>

<sup>1</sup> Deduct.

*Functional feature costs of Grand Valley project to June 30, 1915.*

Examination and surveys.....	\$68,702.02
Canal system.....	2,294,173.78
Lateral system.....	88,106.11
Drainage system.....	1,708.17
Flood protection.....	557.18
Farm units.....	1,815.51
Permanent improvements and land.....	8,644.41
Telephone system.....	9,119.38
Operation and maintenance during construction.....	7,770.45
Stores and other operations.....	1,476.16
Gross expenditures for construction of project to date.....	2,482,073.17

*Estimated cost of contemplated work, Grand Valley project, during fiscal year 1916.*

Examination and surveys.....	\$200.00
Canal system.....	222,670.00
Lateral system.....	114,510.00
Drainage system.....	1,000.00
Flood protection.....	8,000.00
Farm units.....	7,500.00
Operation and maintenance during construction.....	29,000.00
Stores and other operations (reimbursable accounts).....	28,000.00
Unallotted to features.....	150,720.00
Total.....	561,600.00

## **COLORADO, UNCOMPAHGRE VALLEY PROJECT.**

**F. D. PYLE**, project manager, Montrose, Colo.

### **LOCATION AND CLIMATIC CONDITIONS.**

Counties: Montrose and Delta.  
Townships: 15 S., Rs. 94 to 96 W., sixth principal meridian; 48 to 51 N., Rs. 7 to 12 W., New Mexico meridian.  
Railroad: Denver & Rio Grande.  
Railroad stations and estimated population January 1, 1915: Montrose, 3,300; Olathe, 600; and Delta, 2,300.

### **WATER SUPPLY.**

Sources of water supply: Gunnison and Uncompahgre Rivers.  
Area of drainage basins: Gunnison River, 3,850 square miles; Uncompahgre River, 500 square miles.  
Run-off in acre-feet: April to November, inclusive, Gunnison River at River Portal (3,850 square miles), 1905 to 1914: Maximum, 1,798,000; minimum, 917,000; mean, 1,450,000. Uncompahgre River at Fort Crawford (500 square miles), 1896-1899, 1903-1905, 1908-1914: Maximum, 256,700; minimum, 124,000; mean, 170,400.

### **LANDS OPENED FOR IRRIGATION.**

No lands have been opened for irrigation by public notice. All lands irrigated from canals operated by the Reclamation Service are furnished water under rental contracts. All unentered public lands within the project were withdrawn from all forms of entry July 27, 1908.

### **AGRICULTURAL AND CLIMATIC CONDITIONS.**

Area for which the service is prepared to supply water, season of 1915: Estimated at 65,000 acres.  
Area under rental contracts, season of 1915: Estimated at 65,000 acres.  
Area irrigated, season of 1914: 33,873 acres.  
Length of irrigating season: From April 1 to October 31, 214 days, on all Government canals except the Loutsenhizer, under which the season ends November 15.  
Average elevation of irrigable area: 5,500 feet above sea level.  
Average annual rainfall on irrigable area: 15 years, 9.35 inches; 1914, at Montrose, 13.23 inches.  
Range of temperature on irrigable area:  $-25^{\circ}$  to  $98^{\circ}$  F.  
Character of soil of irrigable area: Red sandy gravel, adobe, and clay loam.  
Principal products: Alfalfa, grain, fruits, sugar beets, potatoes, and vegetables.  
Principal markets: Denver, Colo.; Chicago, Ill.; and local mining camps.

### **CHRONOLOGICAL SUMMARY.**

Reconnaissance and preliminary surveys begun in June, 1901.  
Construction recommended by director March 7, 1903.  
Construction conditionally authorized by Secretary March 14, 1903.  
Construction authorized by Secretary June 7, 1904.  
Contract for construction of Gunnison Tunnel approved October 18, 1904.  
First irrigation by Reclamation Service, season of 1908.  
Gunnison Tunnel completed for present use June, 1910.  
Gunnison River diversion dam completed January, 1912.  
Entire project 66.3 per cent completed June 30, 1915.

## IRRIGATION PLAN.

The irrigation plan of the Uncompahgre Valley project provides for the diversion of water from the canyon of Gunnison River by means of a tunnel about 6 miles long and a canal 11 miles long to supplement the flow of Uncompahgre River, and in addition thereto the utilization of all waste, seepage, spring, percolating, and return water arising within the project in the irrigation of lands in Uncompahgre Valley. To distribute the waters of the Uncompahgre and Gunnison Rivers thus combined the plan provides for the purchase, enlargement, and extension of the more important private canals taking water from Uncompahgre River and for supplementing them by laterals, diverting from the South Canal and by high-line canals, one on either side of the valley, taking water from Uncompahgre River.

The surveys for and diamond-drilling investigation of the Taylor Park Reservoir have been completed, but no construction work has been undertaken. The diversion dam in the Gunnison River is complete, except for the installation of steel flash-boards. The Gunnison tunnel is complete to the extent necessary for its present use. There remains about 50 per cent of the length of the tunnel to be lined with concrete. The South, West, and Montrose & Delta Canal systems are now complete, except for the installation of measuring devices and other minor structures, and the excavation, enlargement, and extension of a few small laterals. The Loutsenhizer Canal system is complete, except for the building of one small lateral and the completion of the purchase of the outstanding Loutsenhizer water rights. The Selig Canal system is complete, except for the installation of measuring devices, the completion of the building of structures on the Lower Selig Extension Canals and lateral, and the construction of the Peach Valley lateral and one other small lateral. No construction work has been accomplished on the Ironstone Canal system. The East and Garnet Canal systems are complete, except for the installation of measuring devices and the construction of a few small laterals.

## CONSTRUCTION DURING FISCAL YEAR.

*Taylor Park Reservoir.*—No construction work was accomplished. Hydrographic investigations were continued.

*Gunnison River weir.*—No construction work was accomplished.

*Gunnison Tunnel.*—No construction work was accomplished. The coefficient determinations were continued.

*South Canal system.*—The milepost and structures surveys were completed. The old temporary timber flume on division 18 of the South Canal was replaced with a permanent timber flume having a total length of 409 feet. The Cedar Valley high line lateral was extended for a distance of 3,950 feet to provide a direct wasteway into the Loutsenhizer Canal. Thirty-two linear feet of the 8-inch experimental tile drain along the South Canal were taken up, examined, and replaced with new tile. Several tap boxes and other minor structures were built on the lateral system.

*West Canal system.*—The headworks flume structure for diverting from the South Canal main line was completed; the flume is of the No. 132 Hinman type, 760 feet long, and is carried across the Uncompahgre River on four-plate girder spans supported on concrete piers, 70 feet on centers. The remainder of the flume is of ordinary trestle construction, with 16-foot spans supported on a pile foundation. Concrete approaches were built on both ends of the flume. An informal contract was entered into under date of February 20, 1915, for the furnishing of the four-plate girders for the headworks flume, having a total weight of about 80,000 pounds. The excavation of schedule 1 between station 3+75 and station 15+00 was completed. Miscellaneous timber structures, such as bridges, drops, measuring devices, etc., were built on the lateral system.

*Montrose & Delta Canal system.*—The milepost and structure surveys were completed. The headworks structures completed during

the year consisted of a concrete river intake, of a collapsible flashboard dam supported on a pile foundation, and of an operating bridge for use in raising or lowering the flashboard frames. The control of the concrete river intake is obtained by means of eight 4 by 6 foot cast-iron gates operated with handwheel hoists. The collapsible dam consists of 15 iron flashboard frames, having a maximum height of 6 feet 10 inches when in an upright position; and the operating bridge has a span of 71 linear feet. A combination flume and culvert was built on the Montrose & Delta Canal extension over Big Sandy Creek to relieve flood conditions. Miscellaneous minor structures, such as drops, bridges, measuring devices, etc., were built or replaced on the lateral system.

*Loutsenhizer Canal system.*—The milepost and structure surveys were completed. A feeder channel, 482 feet long, with timber headworks and drops and the same capacity as the main line, was built out of Cedar Creek. The building of structures and excavation of 2.38 miles of the North Mesa lateral extension, having a capacity of 10 feet per second of time, were completed. The unification of Loutsenhizer water rights was completed, the owners of such rights having agreed to accept \$800 per second-foot. Agreements have been entered into for the transfer of approximately 60 per cent of these rights to the United States.

*Selig Canal system.*—The milepost and structure surveys for a portion of the system were completed. A contract was entered into under date of August 7, 1914, for the excavation of the main line, having a length of 3.37 miles and 3.49 miles of the Upper Selig Extension Canal. This work was completed in February, 1915, 180,361.8 cubic yards being excavated. The controlling works out of the Uncompahgre River are located near a county bridge, and the river is confined to a fixed channel by means of sheet piling, which connects both ends of the controlling works with the bridge abutments. The headworks proper is a timber structure supported on a pile foundation, and the flow is controlled by 12 gate openings 3 feet 2 inches wide by 4 feet high in the clear, operated by handwheel hoists. The river controlling works consist of a collapsible flashboard dam of 21 frames, having a maximum height of 6 feet and supported on pile foundation; the flashboard frames are raised and lowered from an operating bridge having a clear span of 96 feet. The main line is carried under the railroad by means of a lined channel involving the excavation of 1,744 cubic yards of wet material and the placing of 184 cubic yards of concrete, the railroad tracks being carried over the crossing on four 20-inch I beams. The superstructure was furnished by the United States, but was placed by the railroad company. A timber chute 1,021 feet long was built on schedule 9 of the Upper Selig Extension Canal. Five timber drops were built along the main line and along the Upper Selig Extension Canal. Combination timber flumes and drops, 91 and 245 feet long, respectively, were built to carry the main line over Cedar Creek and the Upper Selig Extension over the Loutsenhizer arroyo. The excavation and building of structures on the Eckerly lateral, having a length of 7.58 miles and maximum capacity of 90 second-feet, and of its four sublaterals having a total length of 8.46 miles, and of lateral No. 1 of the Upper Selig Extension Canal, having a total length of 1.91 miles, were completed. An informal contract was entered into under

date of January 30, 1915, for the excavation of lateral No. 3 of the Upper Selig Extension Canal, which work was completed in April, 1915, and involved the excavation of 14,532.8 cubic yards. A combination timber flume and two drops having a total length of 169 feet, one other timber drop, three timber bridges and a feeder channel out of the old Loutsenhizer ditch were built on the Lower Selig Extension Canal. Two contracts were entered into—one under date of February 5, 1915, and the other under date of February 6, 1915—for the excavation of Lower Selig Extension Canal and 11 laterals and sublaterals, as per specification No. 293. This work involved the excavation of 4.5 miles of main line, 21.2 miles of lateral, and a total excavation of 110,927.9 cubic yards. Miscellaneous minor timber structures were also built on the system.

*Ironstone Canal system.*—No construction work was accomplished on this system. The unification of the Ironstone Ditch Co. was completed, this company having agreed to turn over its property to the United States on a basis of \$400 per share. No agreements have yet been entered into for the transfer of the shares of stock to the United States. Some additional right of way has been obtained preparatory to the enlargement of the old canal.

*East Canal system.*—The milepost and structure surveys were completed. The river-controlling works were completed. This structure consists of a line of sheet piling, 1,076 feet long, to confine the Uncompahgre River to a fixed channel, and of two collapsible dams supported on a pile foundation. Each dam consists of 16 iron frames having a maximum height of 6 feet and 6 feet 10 inches, respectively, and these frames are raised and lowered from two operating bridges, each having a clear span of 72 feet. The excavation and building of structures on laterals 3, 4, 5, and their sublaterals were completed. These laterals have a total length of 9.68 miles and a total capacity of 53 second-feet. A contract was entered into under date of September 4, 1914, for the excavation of the Cade and Union laterals and their sublaterals. These laterals have a total capacity of 170 second-feet; a total length of 26.49 miles, and their excavation was completed in January, 1915, 132,336 cubic yards being excavated. An informal contract was entered into under date of September 10, 1914, for the excavation of schedules 1, 2, and 4 of the Garnet Mesa siphon trench. This work was completed in October and involved the removal of 13,059.9 cubic yards. The excavation of schedule 3 and of the blow-off trench, consisting of 2,159 cubic yards, was accomplished by Government forces. A contract was entered into under date of August 29, 1914, for furnishing and erecting 8,560 linear feet of continuous metal banded wood-stave pipe 32 inches in diameter, for the Garnet Mesa Siphon. This work was completed in December. Two informal contracts were entered into under dates of November 21, 1914, and December 8, 1914, for the excavation of the 2.9 miles of Orchard Mesa lateral, including the siphon trench. This work was completed in March, a total of 17,050.8 cubic yards being excavated. An informal contract was entered into under date of February 12, 1915, for the excavation of the Orchard Mesa siphon blow-off trench. This work was completed in March, 1,794.9 cubic yards being excavated. An informal contract was entered into under date of February 5, 1915, for furnishing and erecting 1,764 linear feet of 17-inch machine-banded wood



stave pipe for the Orchard Mesa siphon. This work was completed in March. An informal contract was entered into under date of December 14, 1914, for the excavation of the East Canal waste ditch. This work was completed in March, 4,461 cubic yards being excavated. Concrete approaches were built at both ends of the Garnet and Orchard Mesa siphon and the ditch sections on both ends of the Orchard Mesa siphon were lined with metal flume to prevent seepage. Numerous timber structures, such as drops, headgates, bridges, pipe crossover flumes, measuring devices, etc., were built on the lateral system.

*Garnet Canal system.*—This private canal system was turned over to the service in September for operation. The ditch was cleaned out, headworks and headworks dam repaired, other timber structures replaced, measuring devices installed, and the entire ditch system put in a more serviceable condition for the 1915 irrigation season.

*Irrigable land surveys.*—Field work was begun on the final determination and soil classification of project lands.

*Buildings.*—Two timber section houses, of three rooms each, were built—one on the Selig and one on the East Canal system. The South Canal section house was removed to a more suitable location and repaired.

#### OPERATION AND MAINTENANCE.

During the season of 1914 the Reclamation Service supplied and distributed water for the irrigation of 33,873 acres of land, 3,620 acres of which were supplied from the South Canal system; 3,214 acres from the West Canal system; 19,220 acres from the Montrose & Delta Canal system; 5,038 acres from the Loutsenhizer Canal system; and 2,781 acres from the East Canal system. The following private canals, the owners of which have entered into agreements to transfer them to the United States, were supplied with Gunnison water: Garnet, Logan, Delta, Chief, Homerun, Selig, Chipeta, and North Mesa. During the season 183,342 acre-feet of water were diverted into canals operated by the service, 171,268 acre-feet of this amount being delivered to the land. All water was furnished on a rental basis, the charge being \$80 per second-foot per season for all consumers along the Montrose & Delta and South Canals. Those consumers possessing water rights in the Loutsenhizer Canal were assessed \$20 per second-foot for Uncompahgre water and \$60 additional per second-foot for Gunnison water. Private canals were furnished with Gunnison water at the South Canal outlet at the rate of \$60 per second-foot. No difficulty was experienced in the operation of the Gunnison Tunnel and South Canal. During the spring floods considerable expense was undergone in protecting canal headgates and in preventing them from clogging up with drift and other foreign material. Irrigation from the West Canal system started slides on the upper slopes of the Montrose & Delta Canal above the Happy Canyon flume, which made it necessary to build drains. Several heavy rains occurred in the Big Sandy drainage basin, which caused the channel to overflow and fill the Montrose & Delta extension with sand and sediment, and as a consequence irrigating waters were shut off in this portion of the system for a period of 20 days to make

repairs. At the close of the irrigation season a permanent structure was built at this location to prevent similar occurrences. The main line of this system was shut off twice during the season to remove gravel deposits in the headworks.

Several rain floods occurred in the drainage basins above the Loutsenhizer and Lower Selig Extension Canals, which did considerable damage in overtopping the banks of the Loutsenhizer and in washing out the new banks and uncompleted structures on the Lower Selig Extension Canal. The operation of all the other canals was practically continuous. During the irrigation season the operating force was employed in regulating the distribution of water and in making minor repairs, and during the remainder of the year, weather permitting, the same force was engaged in cleaning the canals of vegetable growth and deposits of sand and in repairing and installing structures.

*Historical review, Uncompagre Valley project.*

Item.	1910	1911	1912	1913	1914	1915 <sup>1</sup>
Acreage for which service was prepared to supply water.....	24,000	30,000	44,500	48,000	52,328	65,000
Acreage irrigated.....	17,080	20,995	27,887	31,428	33,873	42,000
Miles of canal operated.....	120.2	131.0	210.7	228.0	270.5	350.0
Water diverted (acre-feet).....	106,335	112,708	130,962	182,191	183,342	220,000
Water delivered to land (acre-feet).....	106,765	112,789	133,912	160,056	171,268	210,000
Per acre of land irrigated (acre-feet).....	6.25	5.44	4.81	5.09	5.06	5.00

<sup>1</sup> Estimated.

### SETTLEMENT.

No public land under this project is open to entry and no public notices have been issued, except the general public notice issued September 24, 1914. The only settlement that has taken place in the past few years has been due to either the transfer of private lands or of entries made prior to July 27, 1908. Many owners have subdivided their holdings and have sold small tracts to new settlers. A large amount of private land is listed for sale, but it is generally held at a high price, the owners still hoping to recover their original investment.

There is no experiment farm on the project, but considerable interest is manifested in the work the Colorado Agricultural College is accomplishing in experimental work. Once each year an agricultural special train passes through the State and spends several hours in each town. Exhibits of various crops are shown and lectures given, and this yearly demonstration has proven to be of great interest and success. The farmers in various localities have formed clubs and are doing much beneficial work in a cooperative way. Considerable interest is manifested in the Annual Western Slope Fair held at Montrose during the latter part of September. There is only one farmers' organization on the project, known as the Grange Cooperative Association. This organization was formed in September, 1913, and has 45 members, who are also members of the four leading granges of the valley, the requirement of membership being that all members must be members of local granges, although the organization itself is entirely separate from the granges. The headquarters are

at Montrose. The association handles fruit and produce for foreign and local consumption, as well as coal, lumber, sacks, spraying materials, etc.

The Uncompahgre creamery, located at Montrose, Colo., was originally organized as a cooperative creamery, but at the present time is entirely a commercial proposition, due to a change in management.

*Settlement data, Uncompahgre Valley project.*

Item.	1912	1913	1914	1915 <sup>1</sup>
Total number of farms on project.....	1,245	1,344	1,470	910
Population.....	5,171	4,265	5,200	2,942
Number of irrigated farms.....	1,245	1,344	1,470	910
Operated by owners or managers.....	(3)	839	920	551
Operated by tenants.....	(3)	505	550	359
Population.....	5,171	4,265	5,200	2,942
Number of towns.....	3	3	3	3
Population.....	6,320	6,400	6,500	6,500
Total population in towns and on farms.....	11,491	10,665	11,700	9,442
Number of public schools.....	(3)	26	22	27
Number of churches.....	(3)	(3)	22	26
Number of banks.....	(3)	(3)	8	8
Total capital stock.....	(3)	(3)	\$425,000	\$360,000
Total amount of deposits.....	(3)	(3)	\$1,692,612.64	\$1,556,963.15
Total number of depositors.....	(3)	(3)	5,950	5,975

<sup>1</sup> The 1915 data given for items 1 to 6, inclusive, apply only to farms under project.

<sup>2</sup> No data.

### PRINCIPAL CROPS.

The season of 1914 was a good crop year as far as yields were concerned, but a poor one with respect to prices received for fruit, hay, potatoes, and onions, and, as a consequence, financial conditions in the valley were not improved. Alfalfa, oats, wheat, potatoes, apples, and sugar beets had the largest acreage in the order named. Small fruits, onions, sugar beets, apples, garden, and potatoes in the order named gave the largest return per acre of crop. Potatoes, alfalfa, wheat, apples, oats, and sugar beets gave the largest per cent of total returns. The low return from alfalfa was due to an abundance of hay and the prospects of a mild winter. The apple and onion crop returns were low on account of an abundance in other localities with better freight facilities. The low returns from sugar beets were due to the cut in price per ton by the sugar factory. The low potato-crop returns were due to poor market conditions and also to potato diseases. The oat-crop returns were increased, due to an increased yield, although the unit price remained about the same. The increase in returns from the wheat crop was due to an increased yield and also a general rise in wheat prices. The increase in yield of nearly all crops during the 1914 season, as compared with the previous year, was due to exceptional weather conditions, no loss at all being experienced from frost, hail, or drought. The crop outlook for 1915 is good, although the first cutting of alfalfa will be light, owing to the cold weather of May. All other crops are in fair condition. The sugar-beet acreage will be further reduced, due to the reduction in contract prices.

*Crop report, Uncompahgre Valley project, Colorado, year of 1914.*

Irrigated crop.	Area (acres).	Unit.	Yields.		Values.			
			Total.	Average per acre.	Per unit.	Total.	Per acre.	
Alfalfa hay.....	12,028	Tons.....	34,638	2.9	\$5.99	\$207,517	\$17.26	
Alfalfa seed.....	20	Bushels.....	27	1.3	8.00	216	10.80	
Apples.....	1,660	Pounds.....	17,044,950	10,268	.006	105,749	63.70	
Barley.....	162	Bushels.....	3,695	22.8	.56	2,069	12.77	
Beans.....	105	do.....	1,502	14.3	2.46	3,708	35.27	
Beets, sugar.....	865	Tons.....	11,876	13.7	4.74	56,253	65.03	
Clover hay.....	185	do.....	162	.9	5.96	966	5.22	
Clover seed.....	3	Bushels.....	2	.7	11.50	23	7.67	
Corn, Indian.....	400	do.....	13,309	33.3	.91	12,142	30.35	
Corn fodder.....	186	Tons.....	567	3	3.79	2,149	11.55	
Fruits, small.....	88	Pounds.....	204,425	2,323	.041	8,418	95.66	
Garden.....	97	do.....				5,371	55.37	
Hay.....	402	Tons.....	618	1.5	6.75	4,169	10.37	
Oats.....	6,166	Bushels.....	222,244	36	.42	93,079	15.10	
Onions.....	234	do.....	57,561	246	.30	17,516	74.85	
Pasture.....	825	do.....				4,614	5.59	
Peaches.....	158	Pounds.....	564,350	3,572	.010	5,768	36.51	
Pears.....	32	do.....	46,040	1,439	.026	1,178	36.81	
Peas.....	188	Bushels.....	541	2.9	.96	520	2.77	
Prunes.....	22	Pounds.....	25,300	1,150	.023	584	26.55	
Potatoes.....	4,557	Bushels.....	675,210	148.2	.31	210,417	46.18	
Rye.....	26	do.....	410	15.8	.99	406	15.61	
Wheat.....	5,244	do.....	142,152	27.1	.88	125,273	23.89	
Miscellaneous.....	217	do.....				2,251	10.51	
Less duplicated areas.....	779							
Total cropped acreage.....	33,091	Total and average.....					870,381	26.30
		Areas.....			Acres.	Farms.	Per cent of project.	
Irrigated, not cropped:								
Nonbearing orchard.....	971	Total irrigable area farms reported...			52,338	910	37	
Miscellaneous.....	17	Total irrigated area farms reported...			33,873	910	24	
Young alfalfa (no crop).....	4,353	Under rental contracts.....			33,873	910	24	
Ground fall plowed.....	828	Total cropped area farms reported...			33,091	910	24	
Less duplicated areas.....	5,387							
Grand total irrigated.....	33,873							

**FINANCIAL STATEMENTS.**

*Assets, liabilities, reserves, and capital, Uncompahgre Valley project, to June 30, 1915.*

**ASSETS.**

Accounts receivable:	
Uncollected miscellaneous items.....	\$1,187.70
Inventories:	
Mercantile stores stock on hand.....	\$8.09
Government animals.....	1,490.00
Mechanical and other equipment.....	7,423.65
Materials and supplies on hand in storehouse.....	43,096.78
Goods in transit.....	451.54
Unadjusted transfers between projects.....	130.32
Undistributed credits (freight and handling).....	<sup>1</sup> 678.99
<b>Total.....</b>	<b>51,911.39</b>

<sup>1</sup> Deduct.

## Construction work in process:

Gross expenditures for construction of project to date.....	\$6,069,833.16
Less revenues earned during construction as follows:	
Rental of buildings.....	\$18,033.98
Rentals of irrigation water.....	292,486.06
Contractors' freight refunds.....	2,646.66
Miscellaneous revenues.....	41.88
Profit on mess houses.....	7,976.07
Profit on mercantile stores.....	20,933.63
Profit on hospital.....	2,602.55
Adjustments—	
Depreciation on plant and equipment.....	1,623.25
Total deductions.....	346,344.08
Net expenditures for construction of project to date.....	\$5,723,489.08
Total assets.....	5,776,588.17

## LIABILITIES, RESERVES, AND CAPITAL.

## Accounts payable:

Unpaid labor.....	\$9,287.52
Unpaid purchases.....	2,226.88
Unpaid freight and express.....	14,162.99
Unpaid passenger fares.....	136.70
Unpaid agreements to purchase real estate.....	1,520.00
Unredeemed coupons.....	408.35
Unredeemed meal tickets.....	53.75
Unpaid agreements to purchase water rights.....	47,077.80
Total.....	74,873.99

## Net investment:

Disbursements.....	\$6,006,804.08
Transfers received from other projects.....	140,259.58
	\$6,147,063.66
Less—	
Collections.....	413,836.53
Transfers issued to other projects.....	31,512.95
	445,349.48
Total.....	5,701,714.18
Total liabilities, reserves, and capital investment of the Government.....	5,776,588.17

*Functional feature costs of Uncompahgre Valley project to June 30, 1915.*

Examination and surveys.....	\$95,017.74
Storage system.....	12,698.92
Canal system.....	3,996,820.47
Lateral system.....	1,525,926.60
Drainage system.....	1,069.24
Power system.....	273.85
Farm units.....	5,040.50
Permanent improvements and land.....	19,536.34
Telephone system.....	6,788.48
Operation and maintenance during construction.....	406,661.02
Gross building expenses of project to date.....	6,069,833.16

*Estimated cost of contemplated work, Uncompahgre Valley project, during fiscal year 1916.*

Storage system.....	\$200.00
Canal system.....	1,800.00
Lateral system.....	276,796.50
Drainage system.....	5,000.00
Farm units.....	13,100.00
Operation and maintenance.....	72,053.50
Stores and other operations—reimbursable accounts.....	6,250.00
Total.....	375,200.00

## **IDAHO, BOISE PROJECT.**

F. E. WEYMOUTH, project manager, Boise, Idaho.

### **LOCATION.**

Counties: Ada, Boise, Canyon, and Elmore.

Townships: 1 S. to 5 N., Rs. 6 W. to 6 E., Boise meridian, and Tps. 21 and 22 S., R. 48 E., Willamette meridian.

Railroads: Oregon Short Line; Boise, Nampa & Owyhee; Idaho Northern; Idaho Traction; Boise and Arrowrock.

Railroad stations and estimated population January 1, 1915: Boise, 20,000; Nampa, 4,500; Caldwell, 4,500; Meridian, 650; and Kuna, 200.

### **WATER SUPPLY.**

Source of water supply: Boise River.

Area of drainage basin: 2,610 square miles.

Annual run-off in acre-feet of Boise River near Highland (2,610 square miles), 1895 to 1914: Maximum, 3,100,000; minimum, 1,200,000; mean, 2,500,000.

### **AGRICULTURAL AND CLIMATIC CONDITIONS.**

Area for which the service is prepared to supply water, season 1915, 243,000 acres, including 13,000 acres of lands in territory of New York Canal Co., and 36,000 acres of doubtful land.

Area under water-right applications and rental contracts, season 1915, 75,130 acres; under special contracts, 18,000 acres.

Length of irrigation season: From April 1 to October 31—214 days.

Average elevation of irrigable area: 2,500 feet above sea level.

Average annual rainfall on irrigable area: At Boise Station for 35 years, 13.50 inches; 1914, 8.60 inches; dry year.

Range of temperature on irrigable area:  $-28^{\circ}$  to  $107^{\circ}$  F.

Character of soil of irrigable area: Clayey loam, light sandy loam, and sandy loam.

Principal products: Alfalfa, wheat, oats, potatoes, apples, prunes, and small fruits.

Principal markets: Boise, Nampa, Caldwell, and Meridian, Idaho; Portland, Oreg., and eastern cities.

### **LANDS OPENED FOR IRRIGATION.**

The project has not yet been formally opened.

Limit of area of farm units: Public, 80 acres; private, 160 acres.

Duty of water:  $2\frac{1}{2}$  acre-feet per acre per annum at the farm.

### **CHRONOLOGICAL SUMMARY.**

Reconnaissance made and preliminary surveys begun in 1902.

Construction recommended by board of engineers February 15, 1905.

Construction authorized by Secretary, March 27, 1905.

Main canals of New York Canal Co. and Idaho-Iowa Lateral & Reservoir Co. acquired March 3, 1906.

First irrigation by Reclamation Service, season of 1906.

Boise River Dam completed September, 1908.

Arrowrock Dam construction authorized January 6, 1911.

Upper Deer Flat embankment completed March, 1911.

Deer Flat Forest embankment completed June, 1911.

Lower Deer Flat embankment completed January, 1912.

Boise River power plant completed May, 1912.

Pioneer District drainage started in November, 1913.

Project, exclusive Boise River storage and exclusive Pioneer drainage, 88 per cent completed June 30, 1915.

Boise River storage (Arrowrock), 96 per cent completed June 30, 1915.

Pioneer drainage, 64 per cent completed June 30, 1915.

Project, inclusive of Boise River storage and Pioneer drainage, 85 per cent completed June 30, 1915.

### IRRIGATION PLAN.

The irrigation plan of the Boise project provides for storage of water in the Arrowrock Reservoir on Boise River about 20 miles above Boise and in the Deer Flat Reservoir near Caldwell and Nampa, Idaho; the diversion of water from Boise River by the Boise River Dam, about 8 miles above Boise; the distribution of water on the south side of Boise River through the Main Canal leading from the dam to the Deer Flat Reservoir; distributing laterals heading in the Main Canal; distributing canals heading in the Deer Flat Reservoir; and distributing canal systems heading in the Boise River below the Boise River Dam; and the distribution of water on the north side of the Boise River to a small area of land east of Boise through a canal system heading at the Boise River Dam. The United States claims all waste, seepage, spring, and percolating water arising within the project, and proposes to use such water in connection therewith. The Boise River Dam, the Deer Flat Reservoir, and the entire canal system, except a few minor ditches and structures, are completed. Construction work on the Arrowrock Reservoir is in progress and nearly completed.

### CONSTRUCTION DURING FISCAL YEAR.

*Storage unit (Arrowrock Dam and related features).*—The Boise power plant has furnished all the electric power required by the construction work for Arrowrock Dam. The total output of the plant for the fiscal year was 5,947,000 kilowatt hours, of which 38½ per cent was sold to the Idaho-Oregon Light & Power Co., including the amount exchanged on account of the drainage construction work.

The Boise & Arrowrock Railroad has been operated successfully throughout the entire year. The freight and passenger train kept up its regular schedule without interruption. The gravel trains were operated (except for about six weeks during the winter months, when concrete work was shut down) until April, when the freight and passenger train crew was able to take over the hauling of concrete material.

The dam proper was completed at the end of the fiscal year with the exception of a small amount of concrete in roadway and parapets and a few relatively unimportant items. A log conveyor has been designed, and its construction is under way. The concrete placed in the dam during the year amounted to 220,000 cubic yards. During the fall and early winter the diversion tunnel was closed permanently, and storage of water in the reservoir was begun in February. It is extremely fortunate that this storage was made available for this irrigation season, as the river is lower this year than ever before since records have been kept. Eighteen of the twenty balanced valves for the regulating outlets have been installed, and the other two are delivered.

At the spillway several rock slides from the upper side of the discharge trench delayed work somewhat and necessitated the removal of about 40,000 cubic yards of material. The lining of this trench with concrete has been nearly finished, and the spillway weir was about 50 per cent completed at the end of the fiscal year. Concrete



placed in the spillway amounted to 22,400 cubic yards, practically all of which was reinforced. A movable crest for the spillway weir has been contracted for, and the control piping, counterweights, etc., for this have been delivered and are being installed as the weir construction proceeds.

The gravel pit and screening plant at the diversion dam, where concrete aggregate was obtained, was operated throughout the year except for about six weeks during the winter.

The output of the sand-cement plant during the year was 235,000 barrels.

*Distribution unit.*—Main Canal: During the year no construction work has been undertaken on the Main Canal except the construction of vertical walls of concrete and rubble masonry above the concrete lining adjacent to the headworks to afford increased capacity in the Main Canal and the installation of a new heading for the Thompson Pipe Line. Some supplemental construction work has been undertaken on the inner slopes of the Main Canal, which have been gravel lined in places to prevent erosion due to wind and wave action.

Deer Flat Reservoir: No new construction work has been undertaken with the exception of that at the outlet of the Deer Flat Caldwell turnout, where approximately 75 feet of 30-inch concrete pipe have been installed to replace the open ditch.

Wasteways: A concrete chute has been provided at Pipe Gulch to serve as a wasteway from the Deer Flat Low Line and Golden Gate Canals into Pipe Gulch, which replaces a temporary wasteway heretofore in use. There have also been installed numerous small wasteways of permanent construction at the ends of laterals. A wasteway from the Mora Canal south to the Snake River has been constructed at Madden Butte. All of these wasteways were much needed and facilitate considerably the operation of the distribution system.

#### DRAINAGE.

The drainage system contemplated by the original contract with the Pioneer irrigation district has been completed during the year.

The drainage surveys in the Nampa-Meridian irrigation district have progressed satisfactorily during the year. The contract between the district and the United States has been ratified by a large majority of the residents of the district at a special election held for that purpose and the proceedings have been approved by the district court.

A supplementary contract for additional drains has been voted by the residents of the Pioneer irrigation district and has been approved by the district court.

The drainage system in the Fargo Basin, embodying about 5,000 acres in the Boise project, was started during the latter part of 1914 and completed in the spring of 1915. The beneficial results of these drains were immediate and far-reaching. In all of the drains so far constructed large amounts of water have been developed and returned to the river to be used for further irrigation. The lands adjacent to these drains, formerly waterlogged, are now being put back into cultivation.

## OPERATION AND MAINTENANCE.

During the season of 1914, 83,590 acres were actually irrigated, including 18,000 acres of New York Canal Co.'s lands, as compared with 76,265 acres in 1913. The water obtained by Government water users was rented at 40 cents an acre-foot to July 31, and at 60 cents an acre-foot after that date. The average amount of water used per acre was 2.62 acre-feet, at an average cost of about \$1.30 per acre.

The right of the United States to divert water from the Boise River terminated during the season of 1914, about July 15. After that date a comparatively small amount of water was available for the lands above the Deer Flat Reservoir. The water was obtained through exchange of water from the Deer Flat Reservoir for the prior rights in the Boise River of the Pioneer irrigation district and the Riverside Irrigation Association, and through the transfer of water thus obtained to the Boise River diversion dam and Main Canal. This water was rotated to the various canals and laterals above the Deer Flat Reservoir that would have otherwise been without water. During the early part of 1915 the Arrowrock Dam had been completed to the extent that it stored at a maximum approximately 180,000 acre-feet of water, making storage water from the reservoir available for the first time during the irrigation season of 1915.

*Idaho-Iowa Lateral & Reservoir Co.'s reservoirs.*—In accordance with the contract entered into March 3, 1906, between the United States and the Idaho-Iowa Lateral & Reservoir Co., the Kuna, Watkins, and Catherine Reservoirs were filled during the year by the United States.

*Maintenance.*—The usual amount and character of maintenance and betterment work has been carried on during the year, consisting of the cleaning and repairing of canals and small structures, the painting of metal work, and the replacement of temporary wooden structures with those of a permanent character when it has been shown that permanent structures will be required.

Considerable stretches of the inner slopes of the Main Canal above Indian Creek have been gravel lined and portions of the canal below Indian Creek have been riprapped with sage brush and lava rock. No serious breaks in the canals occurred during the year and the flow of water was constant and satisfactory.

*Historical review, Boise project, Idaho.*

Item.	1909	1910	1911	1912	1913	1914	1915
Acres to which the service was prepared to furnish water.....	42,000	90,000	120,000	200,000	1207,000	1297,000	1207,000
Acres irrigated.....	21,300	33,377	45,575	61,725	76,265	83,590	93,130
Miles of canals operated.....	193	340	624	966	969	971	973
Water diverted (acre-feet).....	177,124	232,181	337,963	370,056	495,470	495,655	(*)
Water delivered to land per acre of land irrigated (acre-feet).....	2.39	1.67	1.79	1.96	2.38	2.62	(*)

<sup>1</sup> In addition there are 36,000 acres of land included under the system which because of a partial water right are classed as doubtful.

<sup>2</sup> Not yet determined.

**SETTLEMENT.**

The settlement conditions on the project have not changed materially during the year. All of the public lands under the project capable of irrigation have now been thrown open to entry. Those mentioned in the last annual report were thrown open to entry early in 1915, and for the most part were immediately entered. A portion of this land is now being placed in cultivation and substantial improvements are being erected. Practically no farm units have been relinquished or assigned. A small amount of private land has changed hands. The State has held a public sale of State lands during the year in each of the counties embodied in the project. Practically all the land offered has been bid in at these auctions at prices considerably above the appraised value. The new State law allowing payments for State lands to be made in 40 annual installments, with 6 per cent interest on unpaid principal, went into effect during the fiscal year. There are 531 water users under the project who have submitted permanent water-right applications. The project has not yet been opened.

*Settlement data, Boise project.*

Item.	1912	1913	1914	1915
Total number of farms on project.....	2,391	2,450	2,600	2,600
Population of.....	7,000	7,500	8,000	8,600
Number of irrigated farms.....	1,223	1,575	1,771	1,908
Operated by owners or managers.....	1,050	1,350	1,521	1,358
Operated by tenants.....	173	225	250	550
Population of.....	3,669	4,275	5,313	6,143
Number of towns.....	9	10	10	10
Population of.....	30,000	30,350	30,400	30,500
Total population in towns and on farms.....	37,000	37,850	38,400	39,100
Number of public schools.....	16	18	20	22
Number of churches.....	40	45	50	52
Number of banks.....	10	11	11	13
Total capital stock.....	(1)	(1)	\$1,505,000	\$1,545,900
Total amount of deposits.....	(1)	(1)	\$7,326,480	\$8,424,300
Total number of depositors.....	(1)	(1)	27,038	23,772
Total number of relinquishments.....	(1)	15	10	6

<sup>1</sup> No record.<sup>2</sup> Estimated; some banks refuse to give number of depositors.**PRINCIPAL CROPS.**

During the season of 1915 there are approximately 93,130 acres of land under the Boise project in actual cultivation, including 18,000 acres irrigated with New York Canal Co.'s water. Of this 32,602, or 35 per cent, are in hay; 46,555 acres, or 50 per cent, in grain and seed crops; 4,658 acres, or 5 per cent, in orchard; and 9,315 acres, or 10 per cent, in miscellaneous crops.

The average crop returns for the season of 1914 were higher than for any previous year, although the clover-seed yield was cut down by hot winds and grasshoppers. The crops for 1915 are at present in excellent condition and very promising.

*Crop report, Boise project, Idaho, year of 1914.*

Irrigated crop.	Area (acres).	Unit.	Yields.		Values.		
			Total.	Average per acre.	Per unit.	Total.	Per acre.
Alfalfa hay.....	18,128	Tons....	64,753	3.57	\$5.50	\$356,143	\$19.65
Alfalfa seed.....	240	Bushels.	396	1.65	7.50	2,970	12.36
Apples.....	211	Pounds.	352,517	1,671.3	.004	2,350	11.14
Artichokes.....	4.5	Bushels.	270	60	1.00	270	60.00
Barley.....	1,936	do.....	43,161	22.29	.65	23,739	12.25
Beans.....	442	do.....	1,380	3.13	3.00	4,141	9.38
Beets, sugar.....	7	Tons....	24	3.32	5.00	120	16.56
Clover hay.....	6,110	do.....	9,798	1.60	7.00	68,585	11.22
Clover seed.....	6,301	Bushels.	12,166	1.93	7.50	91,248	14.48
Corn, broom.....	3	Tons....	3	.10	35.00	11	3.50
Corn, Indian.....	6,836	Bushels.	126,509	18.51	.70	88,556	12.95
Corn, sorghum.....	19	Gallons.	934	50.5	.50	468	25.27
Corn fodder.....	714	Tons....	2,331	3.26	7.00	16,314	22.84
Corn, pop.....	1.5	Pounds.	1,800	1,200	.03	54	36.00
Fruits, small.....	104	do.....	77,148	743.61	0.05	3,857	37.18
Garden.....	557	Acres....				20,141	36.19
Hay, except as above.....	334	Tons....	332	1.14	5.00	1,912	5.72
Millet seed.....	26	Bushels.	652	23.08	1.50	978	34.62
Oats.....	5,000	do.....	124,833	24.96	.45	56,175	11.10
Onions.....	8	do.....	207	26.13	.80	166	20.10
Pasture.....	4,816	Acres....				43,751	9.09
Peaches.....	42	Pounds.	24,150	576.90	.001	181	4.33
Pears.....	41	Bushels.	329	8.12	1.80	592	14.62
Prunes.....	9	Pounds.	23,895	2,805	.015	358	42.07
Potatoes, common.....	1,107	Bushels.	130,752	118.12	.48	62,761	56.70
Potatoes, sweet.....	9	do.....	261	30.63	2.50	727	76.57
Rye.....	126	do.....	1,321	10.44	.65	858	6.79
Spelts.....	38	Tons....	19	.49	8.00	149	3.92
Wheat.....	11,058	Bushels.	205,906	18.62	.90	185,316	16.76
White clover seed.....	33	do.....	46	1.42	12.00	556	16.99
Less duplicated areas.....	6,259						
Total cropped acreage.	158,064	Total and average.....				1,033,447	17.80
		Areas.			Acres	Farms.	Per cent of project.
Irrigated, not cropped:							
Non bearing orchard.....		6,096	Total irrigable area farms reported	193,011.50	1,577	44.9	
Young alfalfa and clover.....		6,344	Total irrigated area farms reported	64,766.93	1,577	31.3	
Fall plowed.....		741	Under rental contracts.....	64,766.93	1,577	31.3	
Miscellaneous.....		64	Total cropped area farms reported	58,063.88	1,577	28.05	
Less duplicated areas.....		6,532					
Grand total irrigated.		164,767					

<sup>1</sup> In addition there were irrigated 315 farms, or 18,000 acres, New York Canal Co. land and 16 farms, or 823.15 acres, not covered by reports.

<sup>2</sup> Based on 207,000 acres of land.

**FINANCIAL STATEMENTS.**

*Assets, liabilities, reserves, and capital, Boise project, to June 30, 1915.*

**ASSETS.****Cash:**

In employees' hands, awaiting transfer to fiscal agent.....	\$2,301.56	
In fiscal agents' hands for deposit.....	3,512.79	
		<b>\$5,814.35</b>

**Accounts receivable:**

Uncollected water rentals.....	5,111.94	
Uncollected miscellaneous items.....	8,091.95	
		<b>13,203.89</b>

## Inventories:

Mercantile store, stock on hand.....	\$3, 400. 64	
Animals.....	7, 759. 00	
Mechanical and other equipment.....	353, 413. 40	
Materials and supplies on hand in storehouses.....	43, 825. 92	
Goods in transit.....	3, 793. 11	
Unadjusted transfers between projects.....	14, 745. 58	
Undistributed cost (freight and handling on inventory property).....	2, 357. 39	
		<u>\$429, 295. 04</u>

## Construction work contracted:

Unearned value of construction work contracted.....	6, 179. 28
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## Construction work in process:

Gross expenditures for construction of project to date.....	11, 503, 563. 47
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## Revenue earned during construction, as follows—

Rentals of cottages.....	\$23, 251. 12
Rentals of grazing lands.....	12, 368. 00
Rentals of irrigating water.....	262, 368. 95
Rentals of power and light.....	51, 422. 80
Miscellaneous revenues.....	10, 505. 69
Contractors' freight refunds.....	13, 082. 53
Forfeiture by defaulting bidders and contractors.....	24, 197. 92
Profits on mess houses.....	60, 435. 83
Profits on mercantile stores.....	42, 490. 57
Loss on hospital.....	<sup>1</sup> 5, 578. 67

## Adjustments—

Depreciation on plant and equipment.....	304, 486. 27
Profit shown on Government animals.....	22, 474. 04
Profit on operation of Boise & Arrowrock R. R.....	62, 134. 09

Total deductions.....	883, 639. 14
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Net expenditures for construction of project to date.....	10, 619, 924. 33
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Total assets.....	<u>11, 074, 416. 89</u>
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## LIABILITIES, RESERVES, AND CAPITAL.

## Accounts payable:

Unpaid labor.....	\$37, 539. 36	
Unpaid purchases.....	61, 286. 04	
Unpaid freight and express charges.....	53, 462. 81	
Unpaid passenger fares.....	193. 95	
Unpaid agreements to purchase real estate.....	3, 292. 65	
Unredeemed coupon books.....	652. 97	
Unredeemed meal tickets.....	68. 76	
Unpaid miscellaneous.....	5, 980. 18	
		<u>162, 476. 72</u>

## Contingent obligations:

Unearned value of construction work contracted.....	6, 179. 28
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## Net investment:

Disbursements.....	\$11, 199, 420. 80
Transfers received from other projects.....	381, 050. 79
	<u>\$11, 580, 471. 59</u>

## Less—

Collections.....	567, 258. 70
Transfers issued to other projects.....	107, 452. 00
	<u>674, 710. 70</u>

	<u>10, 905, 760. 89</u>
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Total liabilities, reserves, and capital investment of the Government.....

11, 074, 416. 89

<sup>1</sup> Deduct.

*Functional feature costs of Boise project to June 30, 1915.*

<b>Examination and surveys:</b>		
Storage unit.....	\$68,903.89	
Distribution unit.....	71,373.77	
		<b>\$140,277.66</b>
<b>Storage system:</b>		
Arrowrock.....	4,639,682.02	
Deer Flat.....	963,669.65	
		<b>5,603,351.67</b>
Canal system.....	2,012,946.34	
Lateral system.....	2,327,008.95	
Drainage system.....	322,906.54	
Power system.....	249,847.85	
Farm units.....	70,767.50	
Permanent improvements and land.....	118,259.31	
Telephone system.....	43,997.75	
Operation and maintenance during construction.....	614,199.90	
		<b>11,503,563.47</b>

Gross expenditures for construction of project to date..... 11,503,563.47

*Estimated cost of contemplated works, Boise project, during fiscal year 1916.*

Examination and surveys.....	\$19,500.00	
Storage system, Arrowrock Reservoir.....	147,680.00	
Canal system.....	22,500.00	
Lateral system.....	155,600.00	
<b>Drainage system:</b>		
Pioneer irrigation district.....	\$125,000.00	
Nampa-Meridian irrigation district.....	275,000.00	
Miscellaneous.....	11,000.00	
		<b>411,000.00</b>
Farm units.....		<b>12,000.00</b>
<b>Permanent improvements and land:</b>		
Buildings.....	3,500.00	
Roads and grading.....	1,800.00	
Water right, Boise River.....	22,000.00	
		<b>27,300.00</b>
Telephone system.....	2,140.00	
Operation and maintenance during construction.....	182,300.00	
Stores and other operations, reimbursable accounts.....	59,900.00	
Unallotted to features.....	80.00	
		<b>1,040,000.00</b>

Total..... 1,040,000.00

## **IDAHO, MINIDOKA PROJECT.**

H. M. SCHILLING, project manager, Rupert, Idaho.

### **LOCATION.**

Counties: Minidoka and Cassia, Idaho; Jackson Lake Reservoir, Uinta, Wyo.  
Townships: 8 to 11 S., Rs. 22 to 25 E., Boise meridian; Jackson Lake Reservoir, Tps. 44 to 46 N., Rs. 114 to 116 W., sixth principal meridian, Wyoming.  
Railroads: Oregon Short Line; Salt Lake & Idaho.  
Railroad stations and estimated population January 1, 1915: Rupert, 1,200; Heyburn, 300; Burley, 2,000; Ashton, 600; Paul; and Marshfield.

### **WATER SUPPLY.**

Source of water supply: Snake River, supplemented by storage.  
Area of drainage basin: 22,600 square miles above diversion dam.  
Annual run-off in acre-feet of Snake River at Montgomery's and Howell's Ferries and Neeley (16,000 square miles), 1896 to 1914: Maximum, 8,900,000; minimum, 3,830,000; mean, 6,971,000. South Fork of Snake River at Moran, Wyo. (980 square miles), 1904 to 1914: Maximum, 1,640,000; minimum, 920,000; mean, 1,310,000.

### **AGRICULTURAL AND CLIMATIC CONDITIONS.**

Area for which the service is prepared to supply water, season of 1915, 118,300 acres.  
Area under water-right applications and rental contracts, season of 1915, 108,000 acres.

Length of irrigating season: From April 1 to October 31, 214 days.  
Average elevation of irrigable area: 4,225 feet above sea level.  
Average annual rainfall on irrigable area: 9½ years, 12.62 inches; 1914, 12.15 inches; relatively dry.

Range of temperature on irrigable area: -15° to 100° F.  
Character of soil of irrigable area: On north side of river, sand and sandy loam predominate; about one-third of the area is clay loam. On south side of river, the soil is a disintegrated lava ash.

Principal products: Alfalfa, grasses, rye, wheat, oats, sugar beets, potatoes, fruits.

Principal markets: Pocatello, Idaho; Salt Lake, Utah; Butte and Helena, Mont.

### **LANDS OPENED FOR IRRIGATION.**

Dates of public notices and orders relating thereto (gravity unit): Public notices—March 9, 1907; November 23, 1908; February 11, March 30, 1909; February 7, March 22, June 10, October 13, November 3 and 25, 1910; January 23, December 30, 1911; March 21, 1912; June 23, 1913; September 24, 1914; February 27, 1915; March 20, 1915. Orders—July 19, December 10, 1907; July 9, 1908; December 27, 1910; March 18 and 31, May 4, June 8, 1911; February 26, March 19 and 25, July 21, 1913; January 19, March 26 and 31, 1914; March 8, 1915. (South side pumping unit): Orders—March 24, 1911; March 19, May 13, October 10, 1912; March 25, 1913, March 23, 1914; March 1, 1915.

Location of lands opened: Tps. 8 to 11 S., Rs. 22 to 25 E., Boise meridian.  
Present status of irrigable lands opened: 63,370 acres entered subject to the reclamation act; 727 acres open to entry; 5,492 acres of State land; 287 acres in private ownership.

Limit of area of farm units: Public, 80 acres; private, 160 acres.

Duty of water: 3 acre-feet per acre per annum at the farm.

Building charge per acre of irrigable land: \$22, \$30, and \$40.

Annual operation and maintenance charge is based on amount of water used. For 1915 the rate is a minimum of 60 cents for the first acre-foot, plus 5 cents for each additional acre-foot. Those who did not accept the extension act are required to pay an annual drainage charge of 75 cents to \$1 per acre in addition to the charge for water.

Those who accepted the extension act were permitted to add the accrued operation and maintenance charge to their construction charge. About 36,000 acres in the south side pumping unit and about 2,500 acres in the West End, and A-4 pumping systems of the gravity unit, were irrigated in 1914 on a rental basis.

### CHRONOLOGICAL SUMMARY.

First surveys with reference to storage possibilities in 1902.  
Reconnaissance and preliminary surveys for main project begun March, 1903.  
Construction recommended by board of engineers, March 21, 1904.  
Construction authorized by Secretary April 23, 1904.  
Minidoka Dam completed September, 1906.  
Temporary dam on the Moran site, Jackson Lake, completed in 1907.  
First irrigation by Reclamation Service, season of 1907.  
Jackson Lake Dam completed November 25, 1911.  
Contract for enlargement of Jackson Lake Reservoir entered into February 25, 1913.  
Gravity unit, 96.5 per cent completed June 30, 1915, including drainage. South side pumping unit, 95 per cent completed June 30, 1915.  
Entire project, 95 per cent completed June 30, 1915, including drainage and commercial power.

### IRRIGATION PLAN.

The irrigation plan of the Minidoka project provides for the diversion of the waters of the Snake River by a combined storage, diversion, and power dam about 6 miles south of Minidoka, Idaho, into two canal systems, one on either side of the river, watering lands in the vicinity of Acequia, Rupert, Heyburn, and Burley, Idaho. Power developed at the dam is utilized primarily for pumping water from the canals to irrigate high lands, but also for pumping for drainage purposes and for furnishing heat, light, and current for commercial use to the towns on the project and the farms adjacent to them. The United States claims all waste, seepage, spring, and percolating water arising within the project, and proposes to use such water in connection therewith. Storage for the project is provided mainly by a reservoir constructed in the upper drainage basin of Snake River, at Jackson Lake, Wyo. This is supplemented by the reservoir formed by the Minidoka Dam and known as Lake Walcott. Jackson Lake Dam, as originally planned, and Minidoka Dam are completed. Jackson Lake Dam is now being raised 17 feet, which will make the capacity of the lake about 790,000 acre-feet. The irrigation system for the gravity unit and the south side pumping unit and the drainage system for the gravity canals are under construction.

### CONSTRUCTION DURING FISCAL YEAR.

*Buildings.*—A combined shop and storehouse, 52 by 57 feet, of reinforced concrete, was built at the second lift, and a combined blacksmith shop and garage, 41 by 56 feet of the same material was erected at the dam.

*River protection.*—The concrete diversion wall below the spillway was extended about 200 linear feet. It is hoped by this means to stop further damage to adjacent lands.

*Diversion channel.*—The diversion channel below the power house was enlarged and deepened in order to provide a better discharge for the tail water from the turbines. It also increases the available head about 1 foot, with a corresponding increase of about 200 kilowatts in the capacity of the turbines.

A waste channel was excavated below the spillway gates, thus adding greatly to their efficiency. It is estimated that the discharge capacity of these gates was increased 25 per cent by this channel.

A large number of minor permanent improvements were made to the buildings and grounds at the dam.

*North Side Canal system.*—About 10 miles of laterals were purchased and rebuilt, leaving only about 15 miles still in the hands of the



settlers. The 1817 pumping system was completed and put in operation. This includes, besides the canals and structures, a pumping station of the scoop-wheel type, having a capacity of 8 second-feet with a lift of 4 feet. About 326 acres are watered from this system. A considerable number of weirs and orifices were installed. Seven concrete structures were built on the main canals, replacing an equal number of old wooden structures. A metal flume, 200 feet long, was erected on the west end pumping system.

Some construction work was done in connection with the 114 high line near Acequia, and some material for transformer station and transmission line, was purchased.

*South Side Canal system.*—The work of installing new runners in the pumps at the south side stations was completed. The capacities of the stations were thereby increased to the following approximate amounts: Station No. 1, 760 second-feet; station No. 2, 660 second-feet; station No. 3, 430 second-feet. The efficiency of the pumps with the new runners has not yet been accurately determined, but will be more than 80 per cent. The G-20 and J-40 extension to the west end of the project and the B-1 extension near the pumping stations were practically completed. The former will irrigate about 1,000 acres of land and the latter about 1,300 acres. The installation of measuring devices on the laterals was continued. A 12-inch wood stave pipe line, 3,600 feet long, was laid on the H-22B lateral. Nineteen concrete checks on main canals were built and a number of other concrete structures were erected.

*Commercial power.*—The use of power for commercial purposes continued to increase. At Rupert the capacity of the transformer station was reached, while at Burley contracts covering the capacity of the station for the coming year were let. Three 75-kilowatt transformers were moved from Heyburn to Burley. Contracts for power were made with 16 individuals and 3 mutual companies, making a total of 28 persons and companies to whom commercial power is now furnished. Specifications were prepared for use in connection with the transmission line to be built to Albion.

*Jackson Lake Dam enlargement.*—This work was carried on throughout the year when weather conditions permitted. It is sufficiently advanced so that about 46,000 acre-feet of water were stored in Jackson Lake this season, in addition to the normal storage of 380,000 acre-feet for the Reclamation Service. A deputy of the State engineer is in charge of the distribution of the water along Snake River.

The necessity for storing all water possible prevented an early start on the most important work of the season—namely, the construction of the gate section in the river channel. While the water was receding, however, a wagon bridge was constructed across the river below the dam and material excavated below the south end of the dam was conveyed across it and placed in the dike. Rock excavated was conveyed to a convenient point for returning for plum rock in concrete. The south third was cofferdammed and the first concrete was laid on September 19. On September 18, permission having been received to shut off the stored water, the upper cofferdam was closed and all flow from the lake stopped. Another cofferdam was constructed below the dam encircling the north two-thirds, and on October 25 water was turned through the south end of the new dam, thus preventing an increase in the head on the upper cofferdam. On

November 16 concrete work had reached an elevation where it could be resumed in the spring and the weather being severe, it was consequently abandoned for the winter.

The stripping of vegetable matter from the dike foundation and the driving of sheet piles was continued well into the fall. A suction dredge was constructed and operated for a short time, constructing the dike.

Work was resumed about April 1.

At the close of the fiscal year the concrete-gate section was practically complete and the construction of the dike was well under way.

All timber is cut from the forest reserve and towed about 14 miles to the dam and sawed into lumber.

All coal is mined from a Government mine and hauled about 9 miles to the works.

The work was 78 per cent completed on June 30.

*Jackson Hole highway bridge.*—The Jackson Hole highway bridge was constructed by the Security Bridge Co. in pursuance of contract number 572, dated August 22, 1914. It consists of three 130-foot spans supported on steel shells filled with concrete. Work was commenced in the latter part of August and was completed on March 3, 1915.

#### DRAINAGE.

Excavation of open drains through the lands of the north side gravity system was continued. It is estimated that nearly 95 per cent of the total excavation has been completed. The two electric dredges finished their work in the fall of 1914 and one of them was shipped to the Boise project. A small amount of excavation was done by the steam dredges in the spring of 1915. The beneficial effects of the drainage system are becoming increasingly apparent. About 6,000 acres of seeped land, which had been temporarily deducted from the assessable area, were reclaimed, while many more thousands of acres would have been flooded had the drains not been constructed. Many of the farmers are in thorough accord with the attempts made by the service to restrict the amount of irrigation water used and thus reduce the necessity of additional drains. It is evident, however, that there is still a large percentage of settlers who desire to use water excessively, so that an accurate estimate of the ultimate drainage needs of the project is impossible.

A double line of 36-inch cast-iron pipe was laid on the main drain under the Oregon Short Line Railroad and the B Canal. A large number of other structures were erected. A steel, gasoline driven, floating dredge, to be used mainly for maintenance, was bought and put in operation.

The temporary pumping plant at Boersch Lake was burned early in 1915 and was replaced with a permanent concrete station, which is practically completed. The new plant is equipped with two units, having a total capacity of 50 second-feet.

The silting plant was moved in the fall of 1914 to a point near the dam, and was operated as long as the weather would permit. The plant resumed operations in the spring of 1915 and continued until flooded by the leakage from the Main North Side Canal. About 90,000 cubic yards of clay were moved during the year.

**SURVEYS.**

Surveys were made of the high land on the G-20 extension and of railroad and lateral rights of way on the project. A number of subdivision and sectionizing surveys were made. The preparation of a revised list of farm unit areas was begun. Nearly 9,000 acres of land lying along Lake Walcott were restored to entry.

**OPERATION AND MAINTENANCE.**

During the fall of 1914 extensive repairs were made to the Main North Side Canal. A section of canal about 2½ miles in length, beginning about 2 miles from the head, was cleaned out and widened to normal size. The sides were then riprapped with sage brush, which was fastened down with wire netting and stakes.

Early in the spring of 1915 a number of serious leaks developed in the bank of the Main North Side Canal at the silting plant, flooding the plant and forcing it to shut down. Repairs were quickly made, however, so that the full capacity of the canal could be resumed.

One of the main generators at the dam burned out late in June, 1914, but was repaired and put back in service on July 31. Although the accident occurred at the height of the irrigation season, the remaining generators carried the entire pumping load without difficulty and more water was pumped than in 1913. It was gratifying to note that even so serious an accident did not endanger the pumping system.

The West End A-4 and 1812 pumping systems on the gravity unit were operated through the year. The 1817 system was put in operation in time for the season of 1915.

The large number of laterals that have been taken over by the service has greatly increased the labor and cost of operation. Twenty-two ditch riders were employed on the gravity system and 15 on the pumping system.

The latter part of 1914 and the early part of 1915 were characterized by a severe drought. From November 1 to May 1 the total rainfall was only 3.3 inches, while the snowfall in the mountains was correspondingly light. As a result the run-off in Snake River will be unusually low, and many private irrigation companies not provided with storage facilities will suffer.

*Historical review, Minidoka project.*

Item.	1910	1911	1912	1913	1914	1915
Acres for which service was prepared to supply water.....	101,000	112,000	112,000	116,600	117,000	<sup>1</sup> 118,300
Acres irrigated.....	46,000	55,600	70,200	76,000	81,500	<sup>1</sup> 82,000
Miles of canal operated.....	335	315	382	457	520	590
Water diverted (acre-feet).....	442,000	466,300	440,200	480,200	604,000	.....
Water delivered to land (acre-feet).....	336,170	327,100	304,172	383,000	353,000	.....
Per acre of land irrigated (acre feet).....	7.3	5.9	4.3	5.0	4.3	.....

<sup>1</sup> Estimated.



**SETTLEMENT.**

The general financial condition of the settlers shows a steady improvement. The extension act has been accepted by 95 per cent of the water users, who are thus enabled to use their money for the purchase of equipment or for permanent improvements. The various cooperative organizations have been active in promoting the welfare of the farmers. The extension of power lines and the growth in the use of electricity have added much to the comfort as well as to the profit of farm life.

The population of the farms on the project in 1914 was 5,800, and that of the towns was estimated at 3,500. At Burley a new hotel and a high-school building were erected, besides a number of business buildings and residences. All of the other towns on the project show a substantial growth. The improvement in the quality of buildings erected is especially noticeable.

The character of the farm population is becoming more settled. As the prices of lands advance the element of speculation decreases and fewer of the farms change hands than in earlier years.

*Settlement data, Minidoka project.*

Item.	1912	1913	1914	1915
Total number of farms on project.....	2,109	2,092	2,113	2,164
Population of farms on project.....	4,400	4,800	5,200	5,800
Number of irrigated farms.....	1,606	1,708	1,741	1,713
Operated by owners or managers.....	1,406	1,496	1,525	1,402
Operated by tenants.....	200	212	216	311
Population of irrigated farms.....		4,800	5,200	5,800
Number of towns.....	8	5	5	5
Population of towns.....	1,700	2,200	3,000	3,500
Total population of towns and farms.....	6,100	7,000	8,200	9,300
Number of public schools.....		20	21	21
Number of churches.....	11	11	13	21
Number of banks.....	5	6	6	6
Total capital stock.....	\$39,750.00	\$97,500.00	\$137,500.00	\$140,000.00
Total amount of deposits.....	\$125,353.54	\$547,234.84	\$677,007.18	\$821,909.28
Total number of depositors.....	2,346	2,954	4,119	4,721

**PRINCIPAL CROPS.**

The crop report for 1914 shows an increase in yield over 1913 of nearly all crops, while the acreage of some crops is greater and of others less than in the preceding year. Alfalfa hay is still the chief crop raised. The acreage increased nearly 22 per cent during the year and the yield 31 per cent. Potatoes show a decrease in acreage of nearly 10 per cent but an increase in yield of nearly 6 per cent. Sugar beets decreased in acreage 8 per cent but increased in yield more than 13 per cent. The low price for potatoes in 1914 caused many farmers to reduce the acreage of that crop and plant sugar beets instead. The first cutting of alfalfa hay for 1915 has been made, but on account of the cold, rainy weather in May the yield is scanty and the quality poor. It is expected that later cuttings will be good. Other crops are in a promising condition and the general outlook for the year is encouraging.

# 102 FOURTEENTH ANNUAL REPORT OF RECLAMATION SERVICE.

*Crop report, gravity unit, Minidoka project, Idaho, year of 1914.*

Irrigated crop.	Area acres.	Unit of yield.	Yields.		Values.		
			Total.	Average per acre.	Per unit of yield.	Total.	Per acre.
Alfalfa hay .....	19,028	Tons....	63,982	3.36	\$5.00	\$319,910	\$16.81
Alfalfa seed .....	5	Bushels.	5	1	6.00	30	6.00
Apples .....	320	Pounds.	387,208	1,210	.015	5,808	18.15
Barley .....	666	Bushels.	19,906	29.89	.43	8,560	12.85
Beans .....	5	do .....	81	16.20	1.80	146	29.20
Beets, sugar .....	563	Tons....	6,979	12.40	4.75	33,150	58.88
Clover hay .....	914	do .....	3,006	3.29	5.00	15,030	16.44
Clover seed .....	31	Bushels.	28	.92	8.40	239	7.71
Corn, Indian .....	442	do .....	9,226	20.87	.70	6,458	14.61
Corn fodder .....	39	Tons....	146	3.78	5.00	733	18.80
Fruit, small .....	42	Pounds.	25,908	617	.08	2,073	49.36
Garden .....	317	do .....	410	2.15	5.15	15,752	49.69
Hay (mixed) .....	191	Tons....	133,057	30.30	.38	2,111	11.05
Oats .....	4,391	Bushels.	503	37.53	1.00	50,562	11.58
Onions .....	15	do .....	336	33.6	.04	563	37.53
Pasture .....	5,397	Pounds.	3,298	21.78	.90	33,167	6.16
Pears .....	10	Bushels.	565	26.90	1.50	13	1.30
Peas (field) .....	151	do .....	1,595	798	.064	2,960	19.60
Peas (garden) .....	21	Bushels.	330,933	180.2	.30	848	40.38
Prunes .....	2	Pounds.	2,540	17.16	.63	102	51.00
Potatoes .....	1,837	Bushels.	87,334	18.85	.70	99,280	64.04
Rye .....	148	do .....	155	17.22	3.50	1,600	10.81
Wheat .....	4,633	Tons....				61,134	13.20
Stock beets .....	9					543	60.33
Miscellaneous .....	13					1,024	78.77
Total .....	39,190						
Less duplicated areas .....	52						
Total cropped acreage .....	39,138						
Irrigated, not cropped:			Total and average .....			661,796	16.91
Orchard .....	766						
Young alfalfa .....	4,581						
Ground fall plowed .....	1,117						
Miscellaneous .....	1,657						
Less duplicated areas .....	1,529						
Grand total irrigated .....	45,730						

Areas.	Acres.	Farms.	Per cent of project.
Total irrigable area farms reported .....	66,110	1,151	.....
Total irrigated area farms reported .....	45,730	1,151	.....
Under water-right applications .....	45,230	.....	69.2
Under rental contracts .....	500	.....	.....
Total cropped area farms reported .....	39,138	1,151	59.2

*Crop report, South Side pumping unit, Minidoka project, Idaho, year of 1911.*

Irrigated crop.	Area (acres).	Unit of yield.	Yields.		Values.	
			Total.	Average per acre.	Per unit of yield.	Total.
Alfalfa.....	12,385	Tons.....	38,749	3.1	\$5.00	\$193,745
Alfalfa seed.....	5	Bushels.....	10	2	6.00	60
Apples.....	10	Pounds.....	18,880	1,888	.015	283
Barley.....	874	Bushels.....	20,564	23.4	.43	8,843
Beans.....	9	do.....	121	13.4	1.80	218
Beets.....	1,797	Tons.....	17,979	10	4.75	85,358
Clover.....	128	do.....	436	3.4	5.00	2,180
Clover seed.....	67	Bushels.....	320	4.8	8.40	2,688
Corn.....	11	do.....	185	16.8	.70	129
Corn (fodder).....	32	Tons.....	82	2.6	5.00	410
Fruits (small).....	3	Pounds.....	10,337	3,446	.08	827
Garden.....	319					11,211
Hay (mixed).....	7	Tons.....	18	2.6	5.00	90
Mangles.....	8	do.....	78	9.7	3.50	273
Oats.....	3,774	Bushels.....	94,625	25.2	.38	35,958
Onions.....	13	do.....	316	24.4	1.00	316
Pasture.....	3,164					23,535
Peas (field).....	803	Bushels.....	14,706	18.3	.90	12,435
Peas (garden).....	408	do.....	7,156	17.5	1.50	10,734
Potatoes.....	2,298	do.....	263,461	115	.30	79,038
Rye.....	6	do.....	60	10	.63	38
Wheat.....	7,407	do.....	128,128	17.3	.70	80,690
Less duplicated areas.....	16					
Total cropped acreage.....	33,512		Total and average.....			558,050
Irrigated, not cropped:						16.65
Nonbearing orchard.....	502					
Young alfalfa.....	1,970					
Young clover.....	191					
Fall plowed.....	364					
Irrigated, no crop.....	49					
Miscellaneous.....	1,247					
Less duplicated areas.....	2,047					
Grand total irrigated.....	35,788					

Areas.	Acres.	Farms.	Per cent of project.
Total irrigable area farms reported.....	37,800	562	79
Total irrigated area farms reported.....	35,788	562	75
Under rental contracts.....	35,788	562	75
Total cropped area farms reported.....	33,512	562	70

### ORDER DATED JANUARY 29, 1915.

1. In pursuance of the provisions of the reclamation law this order is issued in regard to the laterals on the Minidoka project, Idaho, not heretofore operated by the Reclamation Service.

2. The water supply of all laterals on the project not operated by the Reclamation Service shall be measured at the head of the lateral, and the amount of water so delivered shall be charged equally per acre to the several water-right applicants supplied therefrom, due allowance being made for loss of water in the lateral, which amount shall be determined by the project manager, based upon estimates of loss as made from time to time.

3. If water-right applicants representing more than one-half the acreage taking water from any lateral make written request to the project manager on or before March 1, 1915, that the Reclamation Service take over the lateral, reconstruct and operate it, the same

arrangement will be made for that purpose as has been pursued in the past with other laterals.

THE RECLAMATION COMMISSION,  
By WILL R. KING, *Chief Counsel*.

**PUBLIC NOTICE DATED FEBRUARY 27, 1915.**

1. Under the terms of public notices and orders heretofore issued the operation and maintenance charges for the irrigation season of 1914 for the Minidoka project, Idaho, became due December 1, 1914.

2. In pursuance of the provisions of the reclamation act of June 17, 1902 (32 Stat., 388), and acts amendatory thereof and supplemental thereto, and in particular the reclamation extension act of August 13, 1914 (38 Stat., 686), section 6 of which authorizes the Secretary of the Interior to fix the due date for operation and maintenance charges, notice is hereby given that the operation and maintenance charge for the said project, which under existing public notice became due December 1, 1914, is postponed to and shall become due on March 1, 1915, and all operation and maintenance charges hereafter made against lands under the said project shall become due on March 1 of each year thereafter until further notice.

3. Hereafter no operation and maintenance charge shall be collected at the time water-right application is filed, but the first payment on account of operation and maintenance shall become due on March 1 of the year following the calendar year in which same was made: *Provided, however*, That if original homestead entry or original water-right application be filed after June 15 in any year, the first payment on account of operation and maintenance will not become due until March 1 of the second calendar year following the date of entry.

4. For all landowners and entrymen who accept the terms and conditions of the said reclamation extension act and agree to include and pay the unpaid portion of the drainage cost in the increased charge under the provisions of section 4 of said extension act, the operation and maintenance charge due March 1, 1915, as herein provided, will not include a portion of the drainage cost as stated in public notices heretofore issued.

5. For the operation and maintenance charge due March 1, 1915, no discount will be allowed for payment prior to such date, but penalties as prescribed by the said extension act will attach. As to the operation and maintenance charges due March 1, 1916, and thereafter, the discount for payment made on or before the due date and the penalties for failure to make payment before the first day of the third calendar month after the due date will be applied as provided in section 6 of the said reclamation extension act. The penalties and discounts herein provided for attach for all lands, whether acceptances of the extension act have been filed or not.

6. The operation and maintenance charges for the irrigation season of 1915 shall be due March 1, 1916, and each acre of irrigable land, whether irrigated or not, shall be charged with a minimum operation and maintenance charge of 60 cents, which will permit delivery of not more than 1 acre-foot per acre. Should further quantities be needed they will be furnished at the rate of 5 cents per acre-foot.

7. The provisions of this public notice shall apply to all lands subject to public notice heretofore issued for the said project.

8. Except as hereinabove provided all the terms and provisions of existing public notices and orders for the said project shall remain unchanged.

A. A. JONES,  
*First Assistant Secretary.*

**ORDER DATED MARCH 1, 1915.**

1. Whereas, under the provisions of order dated March 23, 1914, water was furnished on a rental basis in 1914 to lands in the South Side pumping unit, Minidoka project, Idaho, constructed under the reclamation act of June 17, 1902 (32 Stat., 388), and acts amendatory thereof or supplemental thereto; and

2. Whereas a large number of the settlers or landowners are unable to comply with said order and pay the rental charge heretofore announced, and it is desired to continue the development of the lands by irrigation in 1915:

3. Now, therefore, it is hereby ordered that water may be served on a water-rental basis for the season of 1915 to all lands shown on the approved farm-unit plats without the payment of prior water-rental charges, except as hereinafter described, to all settlers and landowners who file formal acceptances of the reclamation extension act of August 13, 1914 (38 Stat., 686), and that no water be furnished to any water user who is in arrears for water-rental charges who fails to file acceptance of the terms of the said extension act.

4. In addition to filing formal acceptance of the said extension act, the settler or landowner shall make application on the form hereto attached, which shall be filed in the office of the Reclamation Service on the Minidoka project, Idaho, accompanied by payment in full of that portion of the rental charge which accrued, if any, on account of the use during June, July, and August, 1912, 1913, and 1914, of water in excess of 1.75 acre-feet per acre in cultivation, as set forth in orders heretofore issued.

5. The minimum rental charge for the irrigation season of 1915 shall be \$1.25 per acre of irrigable land, whether or not water is used thereon.

6. For that portion of the season beginning June 1 and ending August 31, 1915, the maximum amount of water which will be furnished for the minimum charge named in paragraph 5 is 1.75 acre-feet per acre of irrigable land actually under cultivation, approximately equal portions of such amount to be delivered during each month of said period at approximately a uniform rate, so far as practicable, and not in excess of the applicant's proportionate share of the available water supply and capacity of the works: *Provided, however,* That a rotation system of delivery may be installed to encourage the economical use of water, but in no case shall more water be delivered than is reasonably required for beneficial use.

7. All the water used on any farm unit during June, July, and August, 1915, in excess of 1.75 acre-feet per acre of land actually in cultivation thereon, shall be charged for at the rate of 20 cents per acre-foot as measured by the engineers of the Reclamation Service.



8. All charges for 1915, including both the minimum rate and the acre-foot charge for excess supply, shall be due March 1, 1916, and payable to the proper agent of the United States Reclamation Service on the Minidoka project, Idaho. No water will be furnished to any farm unit in 1916, or subsequent seasons, until all charges due against such unit shall have been paid, and such charges shall be subject to the same penalties and to the provisions for cancellation and collection as provided in the reclamation extension act of August 13, 1914, for other operation and maintenance charges.

9. This is a preliminary order made prior to the completion of the project to provide for the rental of water during the season of 1915 only, and is not to be considered as a public notice for the South Side pumping unit or any part thereof.

10. The entire rental charges which may have heretofore accrued against lands under the South Side pumping unit, whether or not any portion of such charges have been paid, except such amounts as may be due for *excess* water furnished in 1912, 1913, and 1914, shall be added to and incorporated in the construction charge to be hereafter announced, and credit for the amount paid for water supplied therefor will be allowed on the building charge on account of each tract: *Provided*, That excess water shall be separately charged against the land on which it is used, and shall be separately collected from the owner or holder thereof.

A. A. JONES,  
*First Assistant Secretary.*

#### ORDER DATED MARCH 8, 1915.

1. In accordance with the provisions of public notice dated December 30, 1911, for the Minidoka project, Idaho, notice is hereby given that a pumping plant and a distributing system for the irrigation of certain highland areas, embracing portions of sections 13 and 14, T. 10 S., R. 22 E., B. M., known as the 1817 pumping extension of the gravity unit of the Minidoka project, are now under construction, and it is expected that water will be available for the irrigation of these lands during the season of 1915.

2. A list of the lands which may be irrigated, together with the approximate areas of each holding that may be watered from the completed works, may be examined at the office of the United States Reclamation Service at Rupert, Idaho. It is expressly understood that such areas are subject to revision for 1915 and subsequent years, if such revision shall be found necessary.

3. To all such lands, whose owners or occupants make written application to the project manager, water will be furnished on a rental basis during the irrigation season of 1915, upon completion of the works which will serve them.

4. For the area on each farm unit or private holding for which during the season of 1915, application for water from the pumping system shall be filed, a rental charge of 60 cents per acre will be made. Payment of this charge will be due on April 1, 1915, and payable at the office of the Reclamation Service, Rupert, Idaho, and water will not be furnished for such lands in 1916 until full payment of all such amounts due hereunder have been made. Such

charges shall be subject to the same penalties and to the provisions for cancellation and collection as provided in the reclamation extension act of August 13, 1914, for other operation and maintenance charges. The above rental charge shall not attach against such of the high lands herein specified as do not apply for water in 1915. This payment will entitle the applicant to 1 acre-foot of water for each acre of irrigable land covered by the application. Additional water will be furnished at the rate of 5 cents for each of the first 3 acre-feet and 10 cents per acre-foot for all additional water above that amount.

5. Public notice will be hereafter issued announcing the charges, terms, and conditions under which entries and water-right applications may be made for such lands.

A. A. JONES,  
*First Assistant Secretary.*

**ORDER DATED JULY 13, 1915.**

1. Water will be furnished on a rental basis in the irrigation season of 1915 to the lands in the West End extension, A-4 raise, 213 lateral, and Boersch-Yahn-Bryant systems of the gravity unit of the Minidoka project, Idaho.

2. A list of the lands which may be irrigated, together with the approximate area of each holding that may be watered from the completed works, may be examined at the office of the United States Reclamation Service, Rupert, Idaho. It is expressly understood that such areas are subject to revision for 1916 and subsequent years, after final survey has been made of the irrigable area.

3. To all such lands whose owners or occupants make written application to the project manager, water will be furnished on a rental basis during the irrigation season of 1915 upon completion of the works which will serve them. The rental charge for the season of 1915 shall be due March 1, 1916, and payable at the office of the United States Reclamation Service, Denver, Colo., and each acre of irrigable land, whether irrigated or not, shall be charged with a minimum rental charge of 60 cents, which will permit delivery of not more than 1 acre-foot per acre. Should further quantities be needed they will be furnished at the rate of 5 cents per acre-foot. Such charges shall be subject to the same discount and penalties and to the provisions for cancellation and collection as provided in the reclamation extension act of August 13, 1914, for other operation and maintenance charges.

4. Public notice will be hereafter issued announcing the charges, terms, and conditions under which entries and water-right applications may be made for such lands.

A. A. JONES,  
*First Assistant Secretary.*

**FINANCIAL STATEMENTS.***Assets, liabilities, reserves, and capital, Minidoka project, to June 30, 1915.*

Cash in employees' hands awaiting transfer to fiscal agent.....		\$0. 25
Accounts receivable:		
Construction charges due and uncollected from water-right applicants.....	\$27, 397. 42	
Construction charges, unaccrued on contracts with water-right applicants.....	1, 403, 356. 69	
Operation and maintenance charges due and uncollected from water-right applicants.....	24, 929. 39	
Uncollected rentals, power and light.....	2, 656. 16	
Uncollected rentals of irrigation water.....	54, 839. 19	
Uncollected miscellaneous items.....	4, 296. 88	
Total.....		1, 517, 475. 73
Inventories:		
Government animals.....	6, 316. 95	
Mechanical and other equipment.....	39, 429. 37	
Materials and supplies on hand in storehouses.....	57, 217. 90	
Goods in transit.....	291. 68	
Unadjusted transfers between projects.....	7, 916. 55	
Undistributed credits (freight and handling on inventory property).....	<sup>1</sup> 2, 657. 35	
Total.....		108, 515. 08
Construction work contracted:		
Unearned value of construction work contracted.....		5, 519. 36
Contingent work in process:		
Gross expenditure for construction of project to date.....	4, 706, 641. 02	
Less revenues earned during construction, as follows:		
Rentals of buildings.....	\$5, 537. 70	
Rentals of grazing and forage lands.....	904. 45	
Rentals of irrigation water.....	53, 549. 77	
Contractors' freight refunds.....	552. 39	
Forfeitures by defaulting bidders.....	65. 00	
Sale of town-site lots.....	140, 324. 59	
Miscellaneous revenues.....	9, 178. 92	
Profits on hospital.....	713. 14	
Adjustments:		
Depreciation on plant and equipment..	15, 340. 58	
Profits shown on Government animals....	969. 38	
Total deductions.....		227, 135. 92
Net expenditures for construction of project to date.....		4, 479, 505. 10
Deferred operation and maintenance charges.....		894, 540. 13
Total assets.....		7, 005, 555. 65

**LIABILITIES, RESERVES, AND CAPITAL.**

Accounts payable:		
Unpaid progress earnings under construction contracts.....	\$16, 048. 71	
Unpaid labor.....	19, 704. 96	
Unpaid purchases.....	14, 530. 75	
Unpaid freight and express.....	10, 362. 32	
Unpaid passenger fares.....	808. 90	
Unredeemed coupon books.....	309. 26	
Unpaid miscellaneous.....	84. 37	
Total.....		61, 849. 27
Contingent obligations:		
Unearned value of construction work contracted.....		5, 519. 36

<sup>1</sup> Deduct.

## Reserves for repayment to reclamation fund of cost of project:

Value of construction water-right contracts with water-right applicants.....	\$1,719,796. 76
Value of construction water-right contracts with water-right applicants, temporarily suspended....	179, 885. 18
Construction charges paid in advance by water-right applicants.....	45, 118. 12
Construction charges paid and forfeited by water-right applicants.....	7, 061. 66
Penalties on construction charges paid by water-right applicants.....	113. 48

Total..... \$1,951,975. 20

## Net investment:

Disbursements.....	\$5, 870, 823. 94
Transfers received from other projects.....	292, 663. 26
	6, 163, 487. 20

## Less—

Collections.....	966, 633. 46
Transfers issued to other projects.....	210, 641. 92
	1, 177, 275. 38
	4, 986, 211. 82

Total liabilities, reserves, and capital investment of the Government..... 7, 005, 555. 65

*Functional feature costs, Minidoka project, to June 30, 1915.*

Examination and surveys.....	\$90, 692. 85
Storage system.....	503, 010. 85
Pumping for irrigation.....	496, 200. 24
Canal system.....	1, 764, 795. 86
Lateral system.....	1, 068, 221. 38
Drainage system (South Side pumping), preliminary.....	251. 27
Power system.....	562, 959. 69
Permanent improvements and land.....	107, 070. 96
Telephone system.....	28, 384. 55
Operation and maintenance during construction.....	83, 675. 41
Supplemental construction.....	1, 377. 96

Gross expenditures for construction of project to date..... 4, 706, 641. 02

*Operating revenues and expenses, Minidoka project, to June 30, 1915.*

## EXPENSES.

Development (storage) works:	
Operation.....	\$136, 871. 83
Maintenance.....	71, 597. 72
Canal system:	
Operation.....	11, 048. 65
Maintenance.....	51, 329. 02
Lateral system:	
Operation.....	147, 209. 06
Maintenance.....	256, 235. 73
Drainage and flood protection:	
Operation.....	15, 492. 91
Maintenance (construction).....	709, 201. 32
Undistributed expense:	
Operation.....	25, 134. 39
Maintenance.....	39, 304. 59
Total.....	1, 463, 425. 22

## REVENUES.

Operation and maintenance charges accrued on contracts with water-right applicants.....	\$359,898.86
Operation and maintenance paid in advance by water-right applicants.....	1,142.11
Operation and maintenance charges paid and forfeited by water-right applicants.....	1,863.63
Penalties for delayed payments made by water-right applicants.....	18.52
Rentals of lands and buildings.....	642.00
Rentals of power and light.....	59,232.40
Rentals of irrigation water.....	81,232.39
Interest on power and light bills paid.....	399.41
Miscellaneous revenues.....	339.87
Estimated plant depreciation.....	64,115.90
Deferred operation and maintenance charges (carried to debit side of assets and liability statement).....	894,540.13
<b>Total.....</b>	<b>1,463,425.22</b>

*Estimated cost of contemplated works, Minidoka project, during fiscal year 1916.*

<b>Pumping plants for irrigation:</b>		
Pumping stations, south side.....	\$4,500.00	
Acequia pumping station.....	3,000.00	
		<b>\$7,500.00</b>
<b>Lateral system:</b>		
Rebuilding sublaterals, gravity unit.....	12,268.00	
Laterals and structures, pumping unit.....	11,907.00	
		<b>24,175.00</b>
<b>Drainage system:</b>		
Open drains.....	37,200.00	
Pumping stations.....	2,800.00	
		<b>40,000.00</b>
<b>Power system.....</b>		<b>7,300.00</b>
<b>Permanent improvements and land:</b>		
Roads.....	1,500.00	
Real estate and town sites.....	2,346.00	
		<b>3,846.00</b>
<b>Operation and maintenance:</b>		
During construction.....	84,340.00	
Under public notice.....	76,000.00	
Plant and equipment.....	5,000.00	
Commercial power.....	14,660.00	
		<b>180,000.00</b>
<b>Stores and other operations:</b>		
Reimbursable accounts.....		7,000.00
<b>Unallotted to features.....</b>		<b>58,179.00</b>
<b>Total.....</b>		<b>328,000.00</b>

*Assets, liabilities, reserves, and capital, Jackson Lake enlargement, to June 30, 1915.*

## ASSETS.

Cash with other employees for transfer to special fiscal agent.....	\$1,532.97
<b>Inventories:</b>	
Mercantile stores stock on hand.....	\$5,525.90
Animals.....	3,607.83
Mechanical and other equipment.....	62,655.47
Material and supplies on hand in storehouses.....	88,242.27
Undistributed cost (freight and handling on inventory property).....	771.44
	<b>160,802.91</b>

## Construction work in process:

Gross expenditures for construction of enlargement to date ..... \$472, 771. 61

Less revenue earned during construction, as follows:

Rentals of cottages..... \$423. 90  
 Loss on mess houses..... <sup>1</sup> 3, 780. 39  
 Profits on mercantile store..... 5, 797. 04  
 Loss on hospitals..... <sup>1</sup> 1, 336. 84  
 Deposits condemnation proceedings... <sup>1</sup> 1, 107. 50  
 Forfeitures by defaulting bidders and  
 contractors..... 490. 00

Total deductions..... 486. 21

Net expenditures for construction of enlargement to date... \$472, 285. 40

Total assets..... 634, 621. 28

## LIABILITIES.

## Accounts payable:

Unpaid contract holdbacks..... \$100. 00  
 Unpaid labor..... 10, 247. 37  
 Unpaid purchases..... 6, 721. 02  
 Unpaid freight and express..... 2, 758. 72  
 Unpaid passenger fares..... 396. 15  
 Unredeemed coupon books..... 226. 95  
 Unredeemed meal tickets..... 5. 05  
 Unpaid miscellaneous..... 2. 67

20, 457. 93

## Reserves for repayment to reclamation fund of cost of enlargement:

Construction charges paid by Kuhn Irrigation & Canal  
 Co..... 383, 950. 83  
 Construction charges paid by Twin Falls Canal Co.... 175, 421. 04

Total..... 559, 371. 87

## Net investment:

Net disbursement vouchers..... \$542, 323. 11  
 Transfers received from projects..... 93, 845. 47

636, 168. 58

## Less:

Collections..... 579, 112. 30  
 Transfers issued to projects..... 2, 264. 80

581, 377. 10

Total..... 54, 791. 48

Total liabilities, reserves, and capital investment of the Govern-  
 ment..... 634, 621. 28

*Functional feature costs, Jackson Lake enlargement, to June 30, 1915.*

Development (storage) works..... \$472, 771. 61

*Estimated cost of contemplated work, Jackson Lake enlargement, during fiscal year 1916.*

Storage system..... \$300, 300. 00  
 Permanent improvements and lands..... 22, 435. 00  
 Stores and other operations:  
 Reimbursable accounts..... 60, 648. 00  
 Unallotted to features..... 92, 617. 00

Total..... 476, 000. 00

<sup>1</sup> Deduct.

## **KANSAS, GARDEN CITY PROJECT.**

### **LOCATION.**

Counties: Finney and Kearny.  
Townships: 23 and 24 S., Rs. 32 to 34 W., sixth principal meridian.  
Railroad: Atchison, Topeka & Santa Fe.  
Railroad stations and estimated population January 1, 1915: Garden City, 3,500; and Deerfield, 200.

### **WATER SUPPLY.**

Source of water supply: Shallow wells near Arkansas River, and natural flow from the river.

### **AGRICULTURAL AND CLIMATIC CONDITIONS.**

Area for which the service is prepared to supply water, season of 1915: No water being supplied by Reclamation Service, on account of failure of water users to pay back charges.

Length of irrigating season: From April 1 to October 31—214 days.

Average elevation of irrigable area: 2,925 feet above sea level.

Average annual rainfall on irrigable area: 19 inches.

Range of temperature on irrigable area:  $-20^{\circ}$  to  $105^{\circ}$  F.

Character of soil of irrigable area: Fertile black sandy loam.

Principal products: Alfalfa, sugar beets, melons, sweet potatoes, small fruits.

Principal markets: Garden City, Kans.; Kansas City, Mo.; Chicago, Ill.

### **LANDS OPENED FOR IRRIGATION.**

Dates of public notices: March 6, 1908, and November 30, 1908.

Location of lands opened: Tps. 23 and 24 S., Rs. 32, 33, and 34 W., sixth principal meridian.

Irrigable lands opened: 10,677 acres, all in private ownership.

Limit of area of farm units: 160 acres.

Duty of water: 2 acre-feet per acre per annum at the farm.

Building charge per acre of irrigable land: \$37.50.

Annual operation and maintenance charge: \$2.75 per acre of irrigable land.

### **CHRONOLOGICAL SUMMARY.**

Reconnaissance made and preliminary surveys begun in 1904.

Construction recommended by board of engineers September 5, 1905.

Construction authorized by Secretary October 5, 1905.

Power plant completed July, 1907.

Conduit and siphon completed July, 1907.

First irrigation by Reclamation Service, season of 1908.

Wells completed, April, 1908.

Pumps: 10 installed in 1907, 13 installed in 1908.

Entire project 98 per cent completed June 30, 1915.

### **IRRIGATION PLAN.**

The irrigation plan of the Garden City project provides for the utilization by pumping of the underground flow of the Arkansas River Valley to supplement the normal flow of Arkansas River distributed through the Farmers ditch to irrigate lands northwest of Garden City, Kans.

A powerhouse is located on the main line of the Atchison, Topeka & Santa Fe Railroad at Deerfield, Kans., and electrical energy is transmitted to 23 pumping stations, located along a concrete-lined canal 20,000 feet in length.

The pumps are connected at three of these stations to 12 15-inch wells each, and at 20 stations to 9 wells each. All of the features of this plan are completed.

**OPERATION AND MAINTENANCE.**

Payment of the Reclamation Service charges has not been made since 1909, and inasmuch as the public notices which have been issued provide that no water shall be furnished in any irrigation season until the operation and maintenance charges of the previous season have been paid, the plant at Deerfield has been closed. The plant itself is not a failure, but the people will not try to make it a success. Since 1909 no water has been pumped, and maintenance work has been confined to the necessary care of the plant.

**FUTURE PLANS.**

During the latter part of July, 1914, Mr. I. D. O'Donnell, supervisor of irrigation, made an investigation of conditions on the project, as a result of which the reclamation commission suggested the appointment of a board of appraisement to visit the project and appraise the property and plant, and to recommend the disposition to be made of the same in the same manner as provided by law and the regulations for the disposition of accumulated and obsolete materials.

**FINANCIAL STATEMENTS.**

*Assets, liabilities, reserves, and capital, Garden City project, to June 30, 1915.*

ASSETS.	
Inventories:	
Mechanical and other equipment.....	\$2, 665. 88
Materials and supplies on hand in storehouse.....	1, 897. 13
Unadjusted transfers between projects.....	140. 00
	<u>\$4, 703. 01</u>
Construction work in process:	
Gross expenditures for construction of project to date...	385, 104. 83
Less revenues earned during construction:	
Rentals of buildings.....	\$739. 58
Rentals of tools.....	5. 00
Rentals of gas engine.....	8. 00
Contractors' freight refunds.....	1, 911. 73
Forfeitures by defaulting bidders and contractors.....	5, 800. 00
Profit on mess houses.....	860. 82
Profit on hospital.....	585. 58
	<u>9, 910. 71</u>
Total deductions.....	
Net expenditures for construction of project to date .....	<u>375, 194. 12</u>
Total assets.....	<u><u>379, 897. 13</u></u>
LIABILITIES, RESERVES, AND CAPITAL.	
Accounts payable:	
Unpaid contract holdbacks.....	\$3, 711. 86
Net investment:	
Disbursements.....	\$380, 060. 56
Transfers received from other projects.....	11, 734. 81
	<u>\$391, 795. 37</u>
Collections.....	4, 560. 67
Collections, repayment refunds.....	247. 00
Transfers issued to other projects.....	10, 802. 43
	<u>15, 610. 10</u>
	<u><u>376, 185. 27</u></u>
Total liabilities, reserves, and capital investment of the Government.....	<u><u>379, 897. 13</u></u>



*Functional feature cost of Garden City project to June 30, 1915.*

Examination and surveys.....	\$7, 618. 72
Storage system.....	106, 183. 64
Canal system.....	89, 960. 40
Power system.....	123, 996. 30
Permanent improvement and land.....	5, 587. 46
Farm units.....	285. 66
Operation and maintenance during constructions.....	52, 472. 65
Gross expenditures for construction of project to date.....	385, 104. 83

*Estimated cost of contemplated work, Garden City project, during fiscal year 1916.*

Operation and maintenance during construction.....	\$1, 600. 00
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## **MONTANA, BLACKFEET (INDIAN) PROJECT.**

J. B. BOND, Project Manager, Browning, Mont.

### **LOCATION.**

County: Teton.

Townships: 31 to 34 N., Rs. 5 to 10 W.; 29 N., R. 8 W.; 30 N., Rs. 6 to 9 W.; and 35 N., Rs. 6 and 7 W., Montana Meridian.

Railroad: Great Northern.

Railroad stations and estimated population January 1, 1915: Browning, 275; Blackfoot, 50; Bombay; Seville; Cadmus; Glacier Park, 100; and Cutbank, 850.

### **WATER SUPPLY.**

Source of water supply: Two Medicine River, Cutbank, Badger, Birch, White-tail and Blacktail Creeks.

Area of drainage basins: 1,700 square miles.

Annual runoff in acre-feet: Cutbank Creek at Cutbank (971 square miles), 1906 to 1914, maximum, 269,000; minimum, 76,370; mean, 170,086. Two Medicine River at Family (368 square miles), 1907 to 1914, mean, 312,438. Badger Creek at Family (224 square miles), 1907 to 1914, mean, 166,700. Birch Creek at Dupuyer (155 square miles), 1907 to 1914, mean, 110,660.

### **AGRICULTURAL AND CLIMATIC CONDITIONS.**

Area for which service is prepared to furnish water, season of 1915: 26,649 acres.

Area under water-right applications, season of 1914, 1,500 acres.

Area irrigated season of 1915: Estimated at 1,000 acres.

Length of irrigating season: May 1 to September 30, 153 days.

Average elevation of irrigable area: 3,850 feet above sea level.

Average rainfall on irrigable area, 1909 to 1914, 12.24 inches; 1914, 12.19 inches.

Range of temperature on irrigable area: - 44° to 100° F.

Character of soil of irrigable area: Principally rich sandy loam; some gravelly loam and gumbo.

Principal products: Hay, grain, and vegetables.

Principal markets: Great Northern Railway towns from St. Paul to the Pacific coast. Local demand for hay for stock feeding.

### **LANDS OPENED TO IRRIGATION.**

No lands have been opened to irrigation by public notice. All lands covered by canals are allotted to Indians.

### **CHRONOLOGICAL SUMMARY.**

Reconnaissance and preliminary surveys made in 1907.

Construction work on the Two Medicine unit begun in July, 1908.

Construction of Two Medicine Lake Dam begun in June, 1911; completed August, 1913.

Construction of the Badger-Fisher unit begun in June, 1911.

Two Medicine unit, 73 per cent completed, June 30, 1915.

Badger-Fisher unit, 69 per cent completed, June 30, 1915.

Entire project, 32 per cent completed, June 30, 1915.

### **IRRIGATION PLAN.**

The irrigation plan of the Blackfeet project provides for five irrigation systems on the Blackfeet Indian Reservation as follows: (1) The Cutbank North Canal system heading on the left bank of Cutbank Creek and supplying water for 20,000 acres of land north and east of the creek, 11,000 acres of which are outside of the reservation;

(2) the Cutbank South Canal system heading on the right bank of Cutbank Creek and supplying water for 18,000 acres of land near Carlow and Seville Stations on the Great Northern Railway; (3) the Two Medicine Canal system, diverting from the left bank of the Two Medicine River and supplying water through the North Branch Canal, the Spring Lake Reservoir, and the South Branch Canal to 48,000 acres of land; (4) the Badger-Fisher Canal system diverting water from the right bank of Badger Creek, supplying water direct through a feeder canal to 3,000 acres of land on the Piegan Flats and through the Four Horns Supply Canal and Reservoir and the Fisher Canal to 33,000 acres of land between Badger and Birch Creeks; and (5) the Birch Creek Canal system, diverting from the left bank of Birch Creek, and supplying water to 3,500 acres of land between Birch and Blacktail Creeks. The United States claims all waste, seepage, spring, and percolating water arising within the project, and proposes to use such water in connection therewith.

The irrigable lands of the project are located in general in the southeastern portion of the Blackfoot Indian Reservation, adjacent to the north bank of Cutbank Creek and between Cutbank Creek and Birch Creek. Of the above irrigation plan the first development of the Two Medicine Canal system is completed, including 36 miles of main canals, with headworks and other structures and a complete distributing system, with structures to deliver water to approximately 24,000 acres of land. A storage reservoir has been completed at Lower Two Medicine Lake to furnish a maximum storage of 16,000 acre-feet of water for this unit. On the Badger-Fisher unit a small canal diverts water from Badger Creek direct to approximately 3,000 acres of the Piegan Flats. A supply canal 12 miles long is completed, except for a wood-stave pipe siphon at the crossing of Whitetail Creek, which will divert the waters of Badger Creek into the Four Horns Reservoir, where storage will be available by the construction of an earth dam and concrete controlling works. Water from this storage will follow a natural channel to Blacktail Creek, from which it is diverted into the Fisher Canal, designed to irrigate about 30,000 acres of the Fisher Flats. The Fisher Canal is completed both as to excavation and structures to the end at mile 30. Excavation of the lateral system is also completed to cover about 20,000 acres of allotted land. The larger structures on the canal system are completed, and the small structures will be built as needed. Construction work of the immediate future includes the construction of a few small structures of the Fisher distributing system, the construction of the wood-stave pipe siphon at the crossing of Whitetail Creek on the Four Horns Supply Canal, the excavation of the outlet of the Four Horns Reservoir, and the construction of a temporary wooden controlling works to provide 4,000 acre-feet storage, and the excavation of the main canal of the Birch unit and construction of the headworks for the same. No work has been done as yet on the Cutbank and Birch units.

#### CONSTRUCTION DURING FISCAL YEAR.

*Badger-Fisher unit.*—On the distributing system of the Fisher Canal 92 miles of laterals and sublaterals were excavated, 3 large concrete chute drops, 37 sublateral concrete turnouts, 6 concrete pipe culverts for lateral road crossings, and 6 wooden highway bridges were constructed. The excavation of the outlet of the Four Horns Reservoir was 60 per cent completed.

#### SURVEYS.

Meander surveys of the Spring Lake, Four Horns, and Two Medicine Lake Reservoirs were made.

#### OPERATION AND MAINTENANCE.

The Two Medicine Canal was operated during the season of 1914 and a total of 760 acres irrigated. The Two Medicine Canal and the Piegan Canal systems are in operation this year. About 1,000 acres are under cultivation, in addition to hay and alfalfa land. On account of the excessive rainfall very little irrigation has been necessary.

*Historical review, Blackfeet project.*

Item.	1911	1912	1913	1914	1915
Acreage for which the service was prepared to furnish water.....	20,000	24,000	26,649	26,649	26,649
Acreage irrigated.....				675	1,000
Miles of canals operated.....		25		44	65
Water diverted (acre-feet).....		3,650	700	15,380	4,000
Water delivered to land (acre-feet).....		41		4,430	200
Per acre of land irrigated (acre-feet).....					

<sup>1</sup> Estimated.**SETTLEMENT.**

Land under the project has not yet been opened for settlement. About 50,000 acres have been allotted to Indians, but, except in a few cases, have not been settled upon by them or farmed.

*Settlement data, Blackfeet project.*

Item.	1912	1913	1914	1915
Total number of farms on project.....	3,000	3,000	3,000	3,000
Population of.....	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )	( <sup>1</sup> )
Number of irrigated farms.....			12	18
Operated by owners or managers.....			12	16
Operated by tenants.....				2
Population of.....			40	50
Number of towns.....	4	4	4	4
Population of.....	300	300	300	375
Total population in towns and on farms.....	300	300	340	425
Number of public schools.....	1	1	1	1
Number of churches.....	2	2	2	3
Number of banks.....				

<sup>1</sup> Not opened.**PRINCIPAL CROPS.**

The principal crops are hay, small grain, and vegetables. The crops grown in 1914 demonstrated that timothy, alfalfa, winter wheat, and potatoes will do very well when given the proper care. Unusual rainfall in 1915 has made irrigation much less necessary than usual, and the lack of warm weather and sunshine has prevented the attainment of the best results on the irrigable lands. On account of the unlimited amount of excellent summer-grazing area immediately adjacent to the irrigable lands the raising and feeding of cattle, sheep, and horses will be the most profitable industry in connection with the development of the project.

*Crop report, Blackfeet project, Montana, year of 1914.*

Irrigated crop.	Area, acres.	Unit of yield.	Yields.		Values.		
			Total.	Average per acre.	Per unit of yield.	Total.	Per acre.
Oats.....	50	Bushel..	1,400	28	\$0.50	\$700	\$14.00
Oat hay.....	170	Ton....	70	.41	8.00	560	3.28
Wheat.....	10	Bushel..	150	15	1.00	150	15.00
Hay.....	220	Ton....	285	1.3	6.00	1,710	7.80
Alfalfa.....	17	do.....	40	2.36	8.00	320	18.80
Potatoes.....	7	Bushel..	900	129	.50	450	64.50
Total cropped acreage..	474						
Irrigated, not cropped:			Total and average..			3,890	8.20
Fall plowing and miscel-							
laneous.....	201						
Grand total irrigated....	675						

Areas.	Acres.	Number of farms.	Per cent of project.
Total irrigable area farms reported.....	1,680	15	6
Total irrigated area farms reported.....	675	15	2.5
Under rental contracts.....	675	15	2.5
Total cropped area farms reported.....	474	15	1.8

**FINANCIAL STATEMENT.***Assets, liabilities, reserves, and capital, Blackfeet (Indian) project, to June 30, 1915.***ASSETS.**

Cash in fiscal agents' possession awaiting remittance.....		\$7.00
Accounts receivable:		
Uncollected freight refunds.....	\$10.67	
Uncollected miscellaneous items.....	10.55	
Total.....		21.22
Inventories:		
Mercantile stores, stock on hand.....	1,788.77	
Animals.....	1,625.00	
Mechanical and other equipment.....	7,258.81	
Materials and supplies on hand in storehouse.....	4,001.74	
Unadjusted transfers between projects.....	783.57	
Undistributed cost (freight and handling on inventory property).....	<sup>1</sup> 141.12	
Total.....		15,316.77
Construction work in process:		
Gross expenditures for construction of project to date....	943,088.36	
Less revenue earned during construction as follows:		
Rentals of cottages.....	\$677.79	
Rentals of telephones.....	683.80	
Contractors' freight refunds.....	36.04	
Profits on mess houses.....	8,648.79	
Profits on mercantile stores.....	18,960.16	
Profits on hospital.....	495.71	
	29,502.29	
Net expenditures for construction of project to date.....		913,586.07
Total assets.....		928,931.06

<sup>1</sup> Deduct.

## LIABILITIES, RESERVES, AND CAPITAL.

Accounts payable:		
Unpaid labor.....	\$409. 74	
Unpaid purchases.....	382. 01	
Unpaid freight and express.....	738. 42	
Unpaid passenger fares.....	8. 60	
Total.....		\$1, 538. 77
Reserves for repayment to reclamation fund of cost of project:		
Construction charges accrued on contracts with Indian Service.....		928, 380. 14
Net investment:		
Disbursements.....	\$923, 993. 56	
Transfers received from other projects.....	109, 270. 70	
		1, 033, 264. 26
Less—		
Collections.....	\$950, 762. 62	
Transfers issued to other projects.....	83, 489. 49	
		1, 034, 252. 11
Total.....		<sup>1</sup> 987. 85
Total liabilities, reserves, and capital investment of the Government.....		928, 931. 06

*Functional feature costs of Blackfeet (Indian) project to June 30, 1915.*

Examination and surveys.....	\$8, 833. 14
Storage system.....	151, 757. 27
Canal system.....	607, 612. 49
Lateral system.....	138, 697. 70
Permanent improvements and land.....	8, 046. 36
Telephone lines.....	8, 298. 20
Operation and maintenance (during construction).....	19, 581. 14
Stores and other operations.....	262. 06
Gross expenditures for construction for project to date.....	943, 088. 36

*Estimated cost of contemplated work, Blackfeet (Indian) project, during fiscal year 1916.*

Examinations and surveys.....	\$1, 200. 00
Storage system:	
Four Horns Dam and temporary controlling works.....	4, 600. 00
Canal system:	
Birch unit—	
Preliminary and general work.....	1, 000. 00
Headworks.....	990. 00
Canal excavation and structures.....	8, 480. 00
Badger-Fisher unit—	
Fisher Canal drop, station 1535.....	2, 950. 00
Four Horns Supply Canal, Whitetail crossing siphon..	5, 005. 00
Setting of gates.....	700. 00
Plant and equipment.....	1, 200. 00
	20, 325. 00
Lateral system:	
Fisher Canal distributaries.....	3, 150. 00
Permanent improvements and land.....	14, 600. 00
Telephone lines.....	500. 00
Operation and maintenance (during construction).....	6, 750. 00
Stores and other operations, reimbursable accounts.....	1, 750. 00
Unallotted to features.....	4, 447. 43
Total.....	57, 322. 43

<sup>1</sup> Deduct:

## **MONTANA, FLATHEAD (INDIAN) PROJECT.**

E. F. TABOR, project manager, St. Ignatius, Mont.

### **LOCATION.**

Counties: Flathead, Missoula, Sanders.

Townships: 15 to 25 N., R. 17 to 25 W., Montana meridian.

Railroad: Northern Pacific.

Towns and estimated population, June 30, 1915: Evaro, 50; Arlee, 100; Ravalli, 75; Dixon, 175; Perma, 50; Camas, 250; Dayton, 145; Big Arm, 100; Polson, 1,300; St. Ignatius, 200; and Ronan, 400.

### **WATER SUPPLY.**

Source of water supply: Flathead, Jocko, and Little Bitter Root Rivers; Mud, Crow, Post, Mission, Dry, Finley, Agency, Big Knife, Valley, and Falls Creeks; and about 60 smaller streams.

Area of drainage basin: 8,000 square miles.

Annual run-off in acre-feet of Flathead River at Polson, 1908 to 1914: Maximum, 9,740,000; minimum, 7,200,000; mean, 8,344,000.

### **AGRICULTURAL AND CLIMATIC CONDITIONS.**

Area for which the service is prepared to supply water, season of 1915: 49,400 acres.

Area under water-rental applications, season 1915 (to June 30): 10,075 acres.

Length of irrigating season: May 1 to September 30, 153 days.

Average elevation of irrigable area: 3,000 feet above sea level.

Average annual rainfall on irrigable area: At St. Ignatius, Mont., station, 1909 to 1914, 16.57 inches; probably less on average irrigable area.

Range of temperature on irrigable area:  $-30^{\circ}$  to  $96^{\circ}$  F.

Character of soil of irrigable area: Varies from light sandy loam to heavy clay.

Principal products: Grain, hay, vegetables, fruit, and cattle.

Principal markets: Missoula, Butte, and Anaconda, Mont., and other mining and lumber towns and camps.

### **LANDS OPENED FOR IRRIGATION.**

Dates of public notices and orders: Proclamation of the President May 22, 1909, opened lands to filing under certain rules as to registration, etc., first filing to be May 2, 1910.

Location of lands opened: Tps. 17 to 24 N., R. 19 to 24 W., Montana meridian.

Present status of irrigable area opened: About 49,600 acres have been entered; 400 acres open to entry; 97,000 acres in private ownership, mostly Indian allotments held under trust patents; 5,000 acres of State lands.

Limit of area of farm units: 160 acres; average irrigable, about 40 acres.

Duty of water: Works will provide about 1.5 acre-feet per acre per annum at the farm.

Building charges: Not fixed.

Annual operation and maintenance charges: \$1 per acre-foot; minimum charge, \$1 per acre, 1915.

### **CHRONOLOGICAL SUMMARY.**

Reconnaissance and preliminary surveys begun in 1907.

Construction authorized and first appropriation made by act of Congress approved April 30, 1908.

Irrigation begun in Jocko and Mission divisions in 1910.

Irrigation in Post division begun in 1911.

Kickinghorse Feeder Canal completed in 1912.

Irrigation in Polson and Pablo divisions begun in 1913.

Entire project 22.8 per cent completed, June 30, 1915.

### IRRIGATION PLAN.

The irrigation plan of the Flathead project provides for the irrigation of about 152,000 acres of land in various parts of what was the Flathead Indian Reservation, water being diverted from creeks and rivers rising in the Mission Mountains and conducted by canals directly to the land and to reservoirs for the storage of flood waters. About 12 reservoirs will be constructed. Some of these are lakes, the capacity of which will increase, and others natural basins, which will require only the building of embankments at low points. The water supply will be supplemented when necessary by pumping from Flathead Lake. Irrigable tracts on the Jocko, Mission, Post, Pablo, and Polson divisions, which contain the largest percentage of irrigable land allotted to the Indians, have been selected for the first development. The United States claims all waste, seepage, spring, and percolating water arising within the project and proposes to use such water in connection therewith.

The following principal features have been completed: A distribution system covering approximately 8,500 acres in Jocko Valley, taking water from Jocko River and tributaries; a distribution system covering about 6,000 acres and taking water from Mission Creek; a distribution system lying below Kickinghorse Dam site, covering about 2,000 acres; a distribution system lying under the Ninepipe Reservoir, covering about 21,500 acres, which, together with the previous-mentioned tract, takes water from Post Creek and tributaries; a distribution system taking water from Crow Creek for about 2,000 acres in Moiese Valley; a distribution system under Pablo Reservoir, taking water from Post, Crow, and Mud Creeks for about 8,200 acres; and a distribution system taking water from the last-named Creeks for about 1,200 acres near Polson. Two storage reservoirs have been constructed—Pablo Reservoir for 5,000 acre-feet and Ninepipe for 5,000 acre-feet. Canals have been dug, but structures are incomplete for an additional area of about 15,000 acres. Contract has been let for the major part of this structure work. The Pablo Feeder Canal has been built from 2 miles south of Post Creek to Pablo Reservoirs, a distance of about 29 miles, picking up the waters of all streams flowing from the mountains.

### CONSTRUCTION DURING FISCAL YEAR.

*Pablo division.*—Work on the 31A tunnel was completed by which water is taken from the Pablo main canal to a valley west of the ridge. Contract work on Pablo Lateral A, to reach 2,000 acres immediately and about 12,000 acres when extended, was completed except as to structures. About 1,700 square yards of paving were added to South Pablo Dam under contract. Contract was let and nearly completed for canal extensions of Pablo Lateral A to cover about 7,000 acres near Horte, Mont.

*Post division.*—The Moiese Valley system was completed and tested out by Government forces.

Additional farm turnouts and measuring devices have been built throughout the project, as called for by new irrigators.

### OPERATION AND MAINTENANCE.

During the calendar year 1914, 258 water-rental applications were received, but only 223 farms were actually irrigated. The irrigable acreage of the 258 farms for which water-rental applications was received was 17,314 and of the 223 farms irrigated 16,251. The acreage irrigated was 6,416, to which 8,752 acre-feet of water were delivered, or an average of 1.36 acre-feet per acre. This is only 0.06 acre-foot above the average use in 1913, though the summer was much drier. In previous years the use has been, in 1910, 4.53; in 1911, 1.99, and in 1912, 1.98 acre-feet per acre. The rotation system of delivery was continued with satisfactory results. To June 30, 1915, 180 water-rental applications were received, representing an irrigable area of 10,075 acres. At that date 71 farms had used 983 acre-feet of water on 1,185 acres. The cause for the small



acreage irrigated to date is the heavy rainfall in May (4.64 inches) and June (2.79 inches) and the fact that at present no part of the charges for operation and maintenance is based on the irrigable acreage, but all upon the number of acre-feet of water delivered with a minimum rate per acre irrigated.

*Historical review, Flathead project.*

Item.	1910	1911	1912	1913	1914	1915 <sup>1</sup>
Acreage for which service was prepared to supply water.....	10,000	19,000	32,000	42,400	48,400	49,400
Acreage irrigated.....	2,191	2,389	4,203	4,631	6,416	1,185
Miles of canal operated.....		46	103	180	233	
Water diverted (acre-feet).....	18,857	10,940	21,875	22,945	46,329	
Water delivered to the land (acre-feet).....	9,936	4,719	8,344	6,014	8,329	968
Per acre of land irrigated (acre-feet).....	4.53	1.99	1.98	1.30	1.36	

<sup>1</sup> To June 30.

**SETTLEMENT.**

There have been few changes in population during the year, as practically all irrigable land had been entered previously. A few transfers have been made and about the last available land has been entered. Indian lands offered for sale have attracted few buyers, who have taken only the best tracts offered. The towns show some new buildings, but are almost stationary as to population. St. Ignatius has a new bank, hospital, and a few dwellings. A small amount of building has been done in Arlee, Dixon, and Ronan. Polson has done little in building.

*Settlement data, Flathead project.*

Item.	1912	1913	1914	1915
Total number of farms on project (irrigable).....	12,980	2,980	2,980	2,980
Population of.....	8,000	8,400	13,855	14,000
Number of irrigated farms.....	111	155	223	* 71
Operated by owners or managers.....	84	127	188	* 65
Operated by tenants.....	27	28	35	* 6
Population of.....	(*)	(*)	578	* 232
Number of towns.....	10	10	10	11
Population of.....	(*)	(*)	2,842	2,845
Total population in towns and on farms.....	(*)	(*)	16,697	16,845
Number of public schools.....			36	48
Number of churches.....			14	14
Number of banks.....			9	9
Total capital stock.....			\$205,000	\$205,000
Total amount of deposits.....			\$535,870	\$495,000
Total number of depositors.....			2,614	2,603

<sup>1</sup> Includes both irrigated and "dry" farms on project.

\* Included in second item.

<sup>2</sup> To June 30, 1915.

**PRINCIPAL CROPS.**

There is an increase of \$1.30 per acre in the average crop value over that for 1913. The total area of the three classes of hay crops is 1,164 acres, which is 150 per cent greater than last year, and there is a total of 495 acres of young alfalfa, clover, and other hay. The real yield and value of hay crops is not fairly shown in the table, as in most cases the farmers cut but one crop and pastured it after that,

and the value of this pasture was not included. It is estimated that had this value been included in the total crop value the average value per acre would have been increased to \$14. There was a very destructive hailstorm in Jocko division on July 13, which severely damaged the crops over an area of 1,600 acres, thus making another material reduction in the average crop value. The average crop value on the 1,600 acres above mentioned was \$7.10, while on similar land not damaged the value was \$12.45. There is a satisfactory increase in live stock on the farms.

*Crop report, Flathead project, Montana, year of 1914.*

Irrigated crop.	Area (acres).	Unit of yield.	Yields.		Values.		
			Total.	Average per acre.	Per unit.	Total.	Per acre.
Alfalfa hay .....	172	Tons....	200	1.2	\$10.00	\$2,000	\$12.00
Barley .....	159	Bushels.	2,611	16.4	1.60	1,567	9.84
Beans .....	4.6	do. ....	14	3.1	3.00	42	9.30
Beets, sugar .....	3	Tons....	2	5.7	5.00	10	28.50
Clover hay .....	387	do. ....	533	1.4	10.00	5,330	14.00
Corn .....	5	Bushels.	17	30.9	1.40	24	43.26
Corn fodder .....	21.4	Tons....	40	1.9	5.00	200	9.50
Flax .....	3.6	Bushels.	43	12	1.15	49	13.80
Fruit, small .....	1.2			(1)			
Garden .....	74.1				85.90	6,354	85.90
Hay, except above .....	604.7	Tons....	575	.9	10.00	5,750	9.00
Oats .....	3,286	Bushels.	100,590	30.3	.37	37,218	11.21
Onions .....	5	do. ....	130	245.3	.86	112	210.96
Pasture .....	267				8.79	2,352	8.79
Peas .....	1.1	Bushels.		(1)			
Potatoes .....	46.5	do. ....	5,369	115.4	.54	2,899	62.32
Wheat .....	1,176	do. ....	18,019	15.3	.95	17,118	14.54
<b>Total cropped acreage .....</b>	<b>* 6,204</b>		<b>Total and average .....</b>			<b>81,026</b>	<b>13.06</b>
<b>Irrigated, no crop:</b>							
Young orchard .....	49.65						
Young alfalfa .....	94.83						
Young clover .....	256.23						
Young hay .....	144.24						
Miscellaneous .....	3.31						
Less duplicated areas .....	336.20						
<b>Grand total irrigated .....</b>	<b>6,416</b>						

Areas.	Acres.	Farms.	Per cent of project.
Total irrigable area farms reported .....	16,251	223	11
Total irrigated area farms reported .....	6,416	223	4
Under rental contracts .....	6,416	223	4
Total cropped area farms reported .....	6,204	223	4

\* No yield.

\* Under irrigation. Additional areas cropped by dry farming.

### FINANCIAL STATEMENT.

*Assets, liabilities, reserves, and capital, Flathead (Indian) project, to June 30, 1915.*

#### ASSETS.

Cash in employees' hands awaiting transfer to fiscal agent .....	\$19.20
Accounts receivable:	
Uncollected construction cost due from Indian Service .....	\$11,584.06
Uncollected rentals of lands .....	101.75
Uncollected rentals of irrigating water .....	2,381.47
Uncollected miscellaneous items .....	204.74
<b>Total .....</b>	<b>14,272.02</b>

## Inventories:

Mercantile stores, stock on hand.....	\$1, 187. 82
Animals.....	3, 555. 00
Mechanical and other equipment.....	10, 057. 00
Material and supplies on hand in storehouses.....	34, 592. 53
Unadjusted transfers between projects.....	63. 30
Undistributed cost (freight and handling on inventory property).....	356. 48

Total..... \$49, 817. 13

## Construction work contracted:

Unearned value of construction work contracted..... 3, 293. 19

Total..... 3, 293. 19

## Construction work in process:

Gross expenditures for construction of project to date 1, 518, 997. 21

Less revenues earned during construction, as follows:

Rentals of buildings.....	\$2, 308. 10
Rentals of lands.....	480. 50
Rentals of irrigating water.....	16, 696. 28
Rentals of telephone lines.....	4, 216. 96
Contractors' freight refunds.....	1, 788. 14
Forfeitures by defaulting contractors.....	875. 00
Miscellaneous revenues.....	361. 96
Profits on mess houses.....	14, 882. 41
Profits on mercantile stores.....	8, 525. 50
Profits on hospitals.....	1, 497. 01

Total deductions..... 51, 631. 86

Net expenditures for construction of project to date..... 1, 467, 365. 35

Total assets..... 1, 534, 766. 89

## LIABILITIES, RESERVES, AND CAPITAL.

## Accounts payable:

Unpaid progress earnings under construction contracts.....	\$4, 862. 72
Unpaid contract holdbacks.....	1, 327. 68
Unpaid labor.....	2, 079. 21
Unpaid purchases.....	1, 283. 32
Unpaid freight and express.....	693. 34
Unpaid passenger fares.....	29. 80

Total..... 10, 276. 07

## Contingent obligations:

Unearned value of construction work contracted..... 3, 293. 19

## Reserves for repayment to reclamation fund of cost of project:

Charges accrued on contracts with Indian Service.. 1, 513, 210. 13

Total..... 1, 513, 210. 13

## Capital investment:

Disbursements..... \$1, 514, 261. 03

Transfers received from other projects 84, 574. 36  
1, 598, 835. 39

## Less—

Collections.....	1, 544, 338. 11
Transfers issued to other projects.....	46, 509. 78
	1, 590, 847. 89

Total..... 7, 987. 50

Total liabilities, reserves, and capital, investment of the Government..... 1, 534, 766. 89

*Functional feature costs, Flathead (Indian) project, to June 30, 1915.*

Examination and surveys.....	\$39,324.16
Storage system.....	359,693.04
Canal system.....	249,205.49
Lateral system.....	663,425.20
Drainage system.....	845.62
Power system.....	101,685.11
Farm units.....	12,027.97
Permanent improvements and land.....	14,158.49
Telephone system.....	7,255.46
Operation and maintenance (during construction).....	70,934.10
Stores and other operations.....	442.57
<b>Total.....</b>	<b>1,518,997.21</b>

*Estimated cost of contemplated work, Flathead (Indian) project, during fiscal year 1916.*

Examination and surveys.....	\$17,000.00
Storage system.....	11,000.00
Lateral system.....	271,025.00
Drainage system.....	16,000.00
Farm units.....	275.00
Permanent structures and land.....	1,500.00
Telephone system.....	3,500.00
Operation and maintenance (water rental).....	35,700.00
Stores and other operations (reimbursable).....	21,230.00
Unallotted to features.....	33,826.56
<b>Total.....</b>	<b>411,056.56</b>

## MONTANA, FORT PECK (INDIAN) PROJECT.

R. M. CONNER, project manager, Poplar, Mont.

### LOCATION.

Counties: Valley, Sheridan.

Townships: 26 to 33 N., Rs. 39 to 56 E., Montana meridian.

Railroads: Great Northern.

Railroad stations and estimated population January 1, 1915: Wiota; <sup>1</sup> Kintyre; <sup>1</sup> Frazer, 30; Oswego, 120; Lohmiller; <sup>1</sup> Wolf Point, 600; Chelsea; <sup>1</sup> Poplar, 800; Sprole; <sup>1</sup> Brockton, 100; Calais; <sup>1</sup> and Blair <sup>1</sup>.

### WATER SUPPLY.

Source of water supply: Missouri and Poplar Rivers; Little Porcupine, Big Porcupine, Wolf, Smoke, and Big Muddy Creeks.

Area of drainage basins: Missouri River, 85,000 square miles; Poplar River, 3,000 square miles; Big Porcupine Creek, 683 square miles.

Annual run-off in acre-feet (1909-1914): Poplar River, mean, 75,900; Big Porcupine Creek at Nashua, mean, 16,700; Little Porcupine Creek, mean, 5,500; Wolf Creek near Wolf Point, mean, 4,900; Big Muddy Creek near Culbertson, mean, 25,200.

### AGRICULTURAL AND CLIMATIC CONDITIONS.

Area for which service is prepared to supply water, season of 1915: Little Porcupine unit, 2,330 acres; Poplar River unit, 10,290 acres.

Area irrigated, season of 1915: 800 acres to June 30, 1915.

Length of irrigating season: From April 1 to August 31, 153 days.

Average elevation of irrigable area: 2,000 feet above sea level.

Average annual rainfall on irrigable area: 1896 to 1914, 14.26 inches; 1914, 17.36 inches; wet year.

Range of temperature on irrigable area: -40° to 100° F.

Character of soil of irrigable area: Heavy clay and loam.

Principal products: Hay, grain, and vegetables.

Principal markets: Local and Minneapolis and St. Paul.

### LAND OPENED FOR IRRIGATION.

In the construction of the systems laterals are being constructed to the allotted areas only. The work of allotting has been completed, but a few changes are being made. The allotted area in each unit is as follows: Big Porcupine, 6,400 acres; Little Porcupine, 2,330 acres; Missouri River, 38,000 acres; Poplar River, 11,600 acres; Big Muddy, 12,900 acres.

### CHRONOLOGICAL SUMMARY.

Reconnaissance and preliminary surveys made in 1908.

Little Porcupine unit completed to allotted irrigable area in July, 1911.

Construction work on project discontinued temporarily July 31, 1911, and resumed October 10, 1912.

Entire project 9 per cent completed June 30, 1915.

### IRRIGATION PLAN.

The irrigation plan for the Fort Peck project provides, in so far as the water supply is found sufficient, for the irrigation of lands in various parts of the Fort Peck Indian Reservation and adjacent territory as follows: (1) 4,000 acres in the vicinity of Wiota station, with flood waters from Big Porcupine Creek; (2) 2,000 acres in the vicinity of Frazer, with water supply from Little Porcupine Creek, conserved by storage; (3)

<sup>1</sup> Population less than 25.

28,000 acres in the vicinity of Poplar and extending along Poplar River a distance of 35 miles, with water supply from Poplar River, conserved by storage below the forks of Poplar and West Branch; (4) 16,000 acres lying along the west side of Big Muddy Creek, with water supply from Big Muddy Creek, conserved by storage on Smoke and Wolf Creeks; (5) 50,000 acres of clear bench land and approximately 34,000 acres of brush and timber land extending along the Missouri River, with water supply from the Missouri River by a gravity canal heading near the site of old Fort Peck; (6) 10,000 acres, known as the Galpin Bottom, lying above the Missouri River Canal west of Milk River and Fort Peck Indian Reservation, with water supply by pumping from the Missouri River Canal, with a lift of about 20 feet; (7) 8,000 acres lying above the Missouri River Canal, east of Milk River, in the Fort Peck Indian Reservation, with water supply from pumping from the Missouri River Canal, with a lift of from 10 to 20 feet. The United States claims all waste, seepage, spring, and percolating water arising within the project and proposes to use such water in connection therewith.

The Little Porcupine unit, with storage reservoir of 3,900 acre-feet, has been completed to irrigate 2,330 acres. Poplar River West Canal B has been completed, to irrigate 2,560 acres of allotted area, and Poplar River East Canal C, to irrigate 5,330 acres of allotted land, is 98 per cent completed. The Big Porcupine Creek Canal, to irrigate 4,000 acres of allotted land on the west boundary of the reservation, is 60 per cent completed.

It is proposed next to construct the Big Muddy unit, on the east boundary of the reservation, to irrigate 12,900 acres of allotted land, and provide necessary storage for this unit and for Poplar River and Big Porcupine units; or to commence construction of the Missouri River Canal, to irrigate 37,900 acres of allotted land along the Missouri River Valley, where the larger percentage of the Indians have their homes.

#### CONSTRUCTION DURING FISCAL YEAR.

The work performed on the Fort Peck project to date has been on the construction of units irrigated from small streams of the reservation. The canals and laterals have been constructed to irrigate only the allotted areas under the Little Porcupine unit and the Poplar River East Canal and West Canal. Poplar River West Canal was extended in the fall of 1913 to furnish water to the agency ditch to avoid the yearly construction of a brush dam and reconstruction of head gates. Work began in October, 1913, on the construction of the Big Porcupine unit with a main canal of 100 second-foot capacity, to irrigate 4,000 acres of very desirable allotted land near Wiota. During the last fiscal year the main canal was practically excavated and the laterals 80 per cent completed. Work is in progress to complete the laterals and to construct the structures along the main canal and laterals. Under the Poplar River unit, the old agency ditch has been cleaned and enlarged and most of the structures renewed. The lateral structures under the Poplar River East Canal C have been practically completed.

#### OPERATION AND MAINTENANCE.

The Little Porcupine unit and the Poplar River West Canal B were first operated during the season of 1913, but owing to the very wet year in 1912 it was difficult to persuade the Indian allottees to use water. A small amount was used, however, as an object lesson. Good progress was being made in 1914 up to the 1st of June, when exceptional rainfall occurred. The precipitation for June, 1914, at Poplar, was 8.62 inches. This was followed by dry, hot weather in July, which matured the crops rapidly, with light yields. The spring of 1915 was exceptionally dry during the months of April and the first half of May. Good progress was made under the Little Porcupine unit by the Indians directed by the local Indian boss farmer.

By a decision of the Comptroller of the Treasury the funds of the project were returned to the Treasury, and no money was available for the operation of the Poplar River unit until late in May. The canals have been cleaned and water delivered where required, throughout the system, during June, 1915.

*Historical review, Fort Peck project.*

Item.	1913	1914	1915
Acceage for which service was prepared to supply water .....	4,970	10,220	12,620
Acceage irrigated .....	410	1,004	11,400
Miles of canals operated .....	30	85	85
Water diverted (acre-feet) .....	800	2,000	13,800
Water delivered to land (acre-feet) .....	800	2,000	12,100
Per acre of land irrigated (acre-feet) .....	1.9	1.5	1.5

<sup>1</sup> Estimated.

**SETTLEMENT.**

In the spring of 1914 the grazing land on the reservation was opened to entry through a drawing held in September, 1913. The settlement of this land has been relatively slow, but with the prospects of a good crop by dry farming this year, additional entries should be made. A large number of the Indians are receiving title to a portion of their grazing land and it is being disposed of at prices ranging from \$10 to \$15 per acre. No irrigable lands have been opened for entry.

*Settlement data, Fort Peck project.*

Item.	1913	1914	1915
Total number allotments on project .....		1,780	1,780
Population (Indians) .....	1,991	1,991	1,946
Number of irrigated farms .....	18	29	145
Operated by owners or managers .....	18	26	140
Operated by tenants .....	(1)	3	5
Population of irrigated farms .....	50	70	1110
Number of towns .....	5	5	5
Population of towns, white .....	980	1,440	1,780
Total population, towns and farms .....	2,971	3,431	3,726
Number of schools:			
Indian .....	5	5	5
White .....	1	2	3
Number of churches .....	5	6	7
Number of banks .....	3	4	5
Total capital stock .....	\$85,000	\$85,000	\$106,000
Total amount of deposits .....	\$180,000	\$223,300	\$234,000
Number of depositors .....	900	1,250	1,400

<sup>1</sup> Estimated.

**PRINCIPAL CROPS.**

The principal crops raised on the reservation are oats, wheat, flax, vegetables, and a large tonnage of blue joint hay. There is an increased acreage each year under the irrigation canals and on dry farming. The greater part of the Indians have their homes along the Missouri River and they try to farm on the dry land. In 1912 good crops were obtained over this area, but for the last two years the results have been very unsatisfactory.

*Crop report, Fort Peck project, year of 1914.*

Crop.	Area acres.	Unit of yield.	Yields.		Values.		Per acre.
			Total.	Average per acre.	Per unit of yield.	Total.	
Hay.....	645	Ton.....	807	1.25	\$6.00	\$4,837	\$7.50
Grain.....	359	Bushel...	6,462	18	.90	5,815	16.20
Total irrigated and cropped.	1,004						
Total and average.....						10,653	10.61

Areas.						Acres.	Number of farms.
Total irrigable area farms reported.....						1,160	29
Total irrigated area farms reported.....						1,004	29
Total cropped area farms reported.....						1,004	29

**FINANCIAL STATEMENTS.***Assets, liabilities, reserves, and capital, Fort Peck (Indian) project, to June 30, 1915.***ASSETS.****Accounts receivable:**

Uncollected construction cost due from Indian Service..	\$4,299.00	
Uncollected miscellaneous items.....	98.17	
		<b>\$4,397.17</b>

**Inventories:**

Mercantile stores, stock on hand.....	\$3,169.70	
Animals.....	3,950.00	
Mechanical and other equipment.....	6,971.21	
Material and supplies on hand in storehouses.....	4,818.50	
Unadjusted transfers between projects.....	<sup>1</sup> 80.49	
Undistributed cost (freight and handling on inventory property).....	59.62	
		<b>18,888.54</b>

**Construction work in process:**

Gross expenditures for construction of project to date....	449,180.90	
Less revenue earned during construction, as fol- lows:		
Rentals of cottages.....	\$289.64	
Miscellaneous revenues.....	484.70	
Profits on mess houses.....	152.81	
Profits on mercantile stores.....	8,723.59	
Profits on hospitals.....	177.29	
Total deductions.....	9,828.03	
Net expenditures for construction of project to date.....	439,352.87	
Total assets.....		<b>462,638.58</b>

**LIABILITIES, RESERVES, AND CAPITAL.****Accounts payable:**

Unpaid labor.....	507.23	
Unpaid purchases.....	43.67	
Unpaid freight and express charges.....	251.79	
Unpaid passenger fares.....	55.75	
Unredeemed coupon books.....	77.70	
Unpaid miscellaneous items.....	237.87	
		<b>1,174.01</b>

<sup>1</sup> Deduct.



Reserves for repayment to reclamation fund of cost of project:

Construction charges accrued on contract with Indian Service..... \$463,034.27

Net investment:

Disbursements..... \$437,442.11

Transfers received from other projects..... 40,735.22

\$478,177.33

Less—

Collections..... 463,558.43

Transfers issued to other projects..... 16,188.60

479,747.03Total..... <sup>1</sup> 1,569.70Total liabilities, reserves, and capital investment of the Government 462,638.58*Functional feature costs of Fort Peck (Indian) project to June 30, 1915.*

Examination and surveys ..... \$32,483.15

Storage system ..... 28,385.00

Canal system ..... 244,987.34

Lateral system ..... 121,955.38

Permanent improvements and land ..... 10,944.20

Operation and maintenance during construction ..... 9,672.80

Stores and other operations ..... 753.03

Total..... 449,180.90*Estimated cost of contemplated work, Fort Peck (Indian) project, during fiscal year 1916.*

Examination and survey..... \$1,550.00

Canal system—Big Porcupine unit..... 18,980.00

Lateral system:

(a) Poplar River unit..... \$1,500.00

(b) Big Porcupine unit..... 26,050.00

27,550.00

Operation and maintenance during construction..... 7,200.00

Stores and other operations—Reimbursable accounts..... 9,900.00

Unallotted to features..... 1,281.32

Total..... 66,461.32<sup>1</sup> Deduct.

## MONTANA, HUNTLEY PROJECT.

R. H. FIELD, project manager, Huntley, Mont.

### LOCATION.

County: Yellowstone.  
Townships: 2 and 3 N., Rs. 27 to 31 E., Montana meridian.  
Railroads: Northern Pacific; Chicago, Burlington & Quincy.  
Railroad stations and estimated population January 1, 1915: Huntley, 150; Osborn;<sup>1</sup> Worden, 110; Newton;<sup>1</sup> Pompeys Pillar, 75; Bull Mountain;<sup>1</sup> Ballantine, 100; and Anita,<sup>1</sup> Mont.

### WATER SUPPLY.

Source of water supply: Yellowstone River.  
Area of drainage basin: 12,000 square miles.  
Annual run-off in acre-feet of Yellowstone River at Huntley (12,000 square miles), 1908 to 1914: Maximum, 7,391,600; minimum, 5,068,000; mean, 6,152,085.

### AGRICULTURAL AND CLIMATIC CONDITIONS.

Area for which the service is prepared to supply water, season of 1915, 30,813 acres.  
Area under water-right applications, season of 1915: 25,775 acres.  
Length of irrigating season: May 1 to September 30—153 days.  
Average elevation of irrigable area: 3,000 feet above sea level.  
Average annual rainfall on irrigable area: 8 years, 13.60 inches; 1914, 12.35 inches; relatively dry year.  
Range of temperature on irrigable area: -35° to 100° F.  
Character of soil of irrigable area: Ranges from heavy clay to light sandy loam.  
Principal products: Alfalfa, oats, sugar beets, and wheat.  
Principal markets: Billings, Mont.; St. Paul and Minneapolis, Minn.; Denver, Colo.; Kansas City, Mo.; Seattle, Wash.

### LANDS OPENED FOR IRRIGATION.

Dates of public notices: May 21, 1907; March 3, 1909; March 13, 1912; June 23, August, 9, 1913; September 24, November 3, 1914; February 27, March 20, 1915.  
Location of lands opened: Tps. 2 and 3 N., Rs. 27 to 31 E., inclusive, M. M.  
Present status of irrigable lands opened: 24,870.26 acres entered subject to the reclamation act; 1,945.43 acres open to entry; 3,997.40 acres in private ownership.  
Limit of area of farm units: 160 acres.  
Duty of water: 2½ acre-feet per acre per annum at the farm.  
Building charge per acre of irrigable land: First unit, public land, \$30 per acre, additional charge of \$4 per acre payable to Indians; private land, \$50 per acre since December 1, 1913, additional charge of \$15 per acre, for supplemental construction for all water-right applicants subject to the terms of the extension act, and all other water-right applicants who agree to the increased charge. Second unit, public land, \$60 per acre, additional charge of \$4 per acre payable to Indians; private land, \$60 per acre.  
Annual operation and maintenance charge: A minimum charge of 90 cents per acre of irrigable land, which entitles the water user to 1 acre-foot of water per acre, and additional water furnished at the rate of 60 cents per acre-foot.

### CHRONOLOGICAL SUMMARY.

Reconnaissance made and preliminary surveys begun in 1904.  
Construction recommended by board of engineers February 26, 1905.  
Construction authorized by Secretary April 18, 1905.  
First irrigation by Reclamation Service, season 1908.  
First unit completed in 1908.  
Second unit completed in 1915.  
Entire project 75.5 per cent completed June 30, 1915.

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<sup>1</sup> Less than 25 population.

**IRRIGATION PLAN.**

The irrigation plan of the Huntley project provides for the diversion of water from the south side of the Yellowstone River, about 2 miles above Huntley, Mont., into a main canal which extends down the valley about 27 miles to a point 2 miles east of Bull Mountain. The greater portion of the water is distributed by gravity. Fourteen miles below the head gates a pumping plant is installed, and a small portion of the water is lifted 45 feet into a high-line canal. The high-line canal serves about 5,160 acres of land above the main canal, in the vicinity of Ballantine, Anita, and Pompey's Pillar. The pumping plant is a reinforced concrete building containing two pumping units, each with a capacity of 28 second-feet and each comprising a turbine water wheel directly connected with a centrifugal pump by means of a vertical shaft. Two hundred and eighty-six net horsepower is developed by a 34-foot drop in the main canal.

It may be necessary when all of the land served by the high-line canal is under cultivation to provide for an additional water supply to said canal. To meet this possible requirement it is proposed to develop electrical power at the second drop in the main canal, transmitting power back to the pumping plant, and install an auxiliary pumping unit. This development would increase the water delivery into the high-line canal approximately 30 per cent and would necessitate the enlarging of the first 6 miles of the high-line canal.

During the present season all of the main canal and the first 7 miles of the high-line canal are being utilized for irrigation purposes.

The United States claims all waste, seepage, spring, and percolating waters arising within the project, and proposes to use such waters in connection therewith.

Future operations include the construction of approximately 40 miles of drainage canals, the replacing of all timber structures in the first unit with permanent type structures, the construction of a power plant, transmission line, auxiliary pumping unit, and the enlarging of the high-line canal.

**CONSTRUCTION DURING FISCAL YEAR.**

*Second unit.*—Thirteen timber drops in small laterals and one concrete check in the main canal were constructed and improvements were made to a number of structures and canals.

*Third unit.*—Thirteen concrete checks, 2 concrete drops, 46 timber drops, and 12,100 lineal feet of laterals were constructed. Repairs were also made to structures and canal embankments.

**DRAINAGE.**

Drains Nos. 5-1 and 17, aggregating 21,219 lineal feet, were constructed under contracts, and drains Nos. 11, 12, 12-1, 15, and 21, aggregating 20,853 lineal feet, were constructed by Government forces. In addition to the above, 11,825 lineal feet of open drain No. 10, serving as an outlet to several tile drains, were lowered and widened by Government forces.

The contractors started work on August 24, 1914, and completed their contracts on December 2, 1914. Work by Government forces was in progress at the beginning and close of the fiscal year. The Government work was suspended from December 24, 1914, to May 18, 1915.

All of the drains, except those designated as open outlets, are deep, closed drains, intended for removing the excess water which finds its way into the subsoil through underground losses from irrigation or seepage from canals. In locating the drains, careful investigations were made of the subsoil conditions, and the drains were located as far as practicable in pervious or water-bearing materials. The results obtained have been a general lowering of the ground waters over those areas tributary to the drains.

The closed drains apparently possess advantages over the open drains on this project, as the required depth can be more easily maintained in them over much of the material encountered than in the case of open drains. Closed drains are accordingly being constructed where practicable.

#### OPERATION AND MAINTENANCE.

The operating season of 1914 opened on May 25 and closed on September 14. Owing to timely rains in the spring the season opened about 15 days later than usual. During June, July, and August the season was dry and there were periods of heavy water requirements. A number of light rains occurring around September 20 closed the irrigation season 15 days earlier than formerly.

The operating season of 1915 opened on April 18—20 days earlier than usual. The small amount of precipitation during the winter months and the continued dry weather of March and April caused the early requirement for water.

During both seasons water was delivered under a four-day rotation system providing for a continuous flow in the laterals and the rotation of alternate farm units. The entire canal system comprising 194 miles of canals, and the pumping plant, serving the first unit of the project, were in operation during the calendar year 1914. In the spring of 1915, operation was resumed of the entire canal system, comprising 210 miles of canals, and the pumping plant, serving the first and second units of the project.

During the irrigation season of 1914 and the first half of the 1915 season no unusual rain storms and no serious breaks in the canals occurred. A small maintenance force was employed throughout the operating season of 1914 mowing weeds and making minor repairs to canals and structures. While a large portion of the work was performed during the fall of 1914, some work still remained to be performed during the spring of 1915.

#### *Historical review, Huntley project.*

Item.	1910	1911	1912	1913	1914	1915 <sup>1</sup>
Acreage for which Service was prepared to deliver water.....	28,805	28,805	28,805	28,805	28,805	30,813
Acreage irrigated.....	8,000	12,000	14,425	15,798	17,068	19,000
Miles of canal operated.....	175	175	194	194	194	210
Water diverted (acre-feet).....	48,788	46,994	54,702	55,543	56,000	
Water delivered to land (acre-feet).....	15,787	22,550	21,437	24,118	24,429	27,550
Per acre of land irrigated (acre-feet).....	2.03	1.88	1.5	1.53	1.43	1.46

<sup>1</sup> Estimated.

#### SETTLEMENT.

During the fiscal year there were 23 new filings, 2 farms changed hands by relinquishment, and 10 farms changed hands by assignment and transfer. Apparently the majority of the present population on the project is permanently settled. The speculators and the floating class of settlers are being gradually replaced by permanent settlers.

On December 1, 1914, 24 farm units in the second unit were opened to homestead entry, and at the close of the fiscal year 18 of the units had been filed upon.

*Settlement data, Huntley project.*

Item.	1912	1913	1914	1915
Total number of farms on project.....	585	585	586	646
Population of.....	1,420	1,659	1,700	1,754
Number of irrigated farms.....	480	527	535	544
Operated by owners or managers.....			432	415
Operated by tenants.....			103	129
Population of.....	1,420	1,659	1,700	1,754
Number of towns.....	8	8	8	8
Population of.....	325	350	475	475
Total population in towns and on farms.....	1,745	2,009	2,175	2,229
Number of public schools.....	13	13	14	15
Number of churches.....	5	5	6	6
Number of banks.....	2	2	3	3
Total capital stock.....	\$40,000	\$10,000	\$30,000	\$60,000
Total amount of deposits.....			\$220,000	\$239,000
Total number of depositors.....			886	1,060
Number of relinquishments.....	27	16	4	2

**PRINCIPAL CROPS.**

During the season of 1914 there were 17,068 acres cropped and irrigated. Sugar beets, alfalfa, wheat and oats, in the order named, were the most important crops grown, representing about 89 per cent of the total cropped area for the season and 90 per cent of the total estimated crop value. The gross crop value for the project amounted to \$454,583.

The crop outlook for 1915 is good. There are approximately 2,000 acres more land seeded to beets than in 1914; small grains are further along than a year ago; and the prospects are that the crop returns of 1915 will exceed those of 1914.

*Crop report, Huntley project, Montana, year of 1914.*

Irrigated crop.	Area (acres).	Unit of yield.	Yields.		Values.		
			Total.	Average per acre.	Per unit of yield.	Total.	Per acre.
Alfalfa.....	6,038	Tons....	17,440	2.9	\$5.00	\$87,200	\$14.45
Alfalfa seed.....	69	Bushels.	419	6.1	7.00	2,933	42.50
Barley.....	363	do.....	6,689	18.4	.53	3,545	9.75
Blue stem.....	160	Tons....	214	1.34	12.00	2,568	16.08
Beans.....	40	Bushels.	511	12.8	3.00	1,533	38.60
Corn.....	497	do.....	11,755	23.75	.62	7,288	14.65
Clover hay.....	36	Tons....	59	1.66	12.00	708	19.80
Cucumbers.....	32	Pounds.	303,000	9,469	.0125	3,788	118.36
Grain hay.....	15	Tons....	20	1.31	6.00	120	7.88
Fodder.....	56	do.....	85	1.52	6.00	510	9.12
Millet.....	8	do.....	12	1.5	6.00	72	9.00
Oats.....	3,226	Bushels.	96,014	29.8	.32	30,724	9.54
Potatoes.....	120	do.....	10,680	89	.62	6,622	55.18
Peas.....	51	do.....	470	8.44	.75	353	6.37
Rye.....	9	do.....	28	3.1	.60	17	1.87
Spelts.....	8	do.....	32	4	.80	26	3.20
Sugar beets.....	4,274	Tons....	41,030	9.6	6.00	246,180	57.60
Timothy.....	138	do.....	184	1.33	12.00	2,208	15.95
Truck.....	265				75.00	19,875	75.00
Wheat.....	1,663	Bushels.	39,095	23.5	.98	38,313	23.03
Total cropped and irrigated acreage.....	17,068	Total and average.....				454,583	26.63

Areas.	Acres.	No. farms.	Per cent of proj. <sup>1</sup>
Total irrigable area farms reported.....	23,160	526	80.4
Total irrigated area farms reported under water-right applications.....	17,068	526	59.2
Total cropped area farms reported.....	17,068	526	59.2

<sup>1</sup> First unit.

**PUBLIC NOTICE DATED NOVEMBER 3, 1914.**

1. In pursuance of the provisions of section 5 of the act of April 27, 1904 (33 Stat., 357), of section 4 of the reclamation act of June 17, 1902 (32 Stat., 388), and acts amendatory thereof and supplementary thereto, notice is hereby given that water will be furnished under the Huntley project, Montana, in the irrigation season of 1915 and thereafter for the irrigable lands of the second unit of said project designated upon farm unit plats of Montana principal meridian—township 3 north, range 30 east; township 3 north, range 31 east, approved by the Secretary of the Interior September 19, 1914, on file at the office of the project manager, Huntley, Mont., and at the local land office at Billings, Mont.

2. Homestead entries of the farm units in said second unit embracing public lands of the United States shown on said plats may be made in the manner, and on and after the date, fixed therefor in the land office notice hereinbelow, under the provisions of said act and acts amendatory thereof and supplemental thereto; and water-right application therefor must be made to the project manager prior to such entry accompanied by the first installment of the construction charge hereinafter described.

3. The limit of area per entry representing the acreage which in the opinion of the Secretary of the Interior may be reasonably required for the support of a family upon the lands is fixed at the amounts shown on the plats for the several farm units.

4. Water-right applications for lands in private ownership included in said second unit may be made on and after the date of this notice. The limit of area for which water-right application may be made for lands in private ownership shall be 160 acres of irrigable land for each landowner.

5. The charges per acre of irrigable land upon said entries and upon all other lands in said second unit shown upon said plats are of two kinds—namely, (a) a charge of \$60 per acre for the building of the irrigation system, termed the construction charge; (b) an annual charge for operation and maintenance due March 1 of each year. In addition, there will be, for all homestead entries, a charge of \$4 for each acre of land included within the entry, whether irrigable or not, to cover the Indian price of the land. Each acre of irrigable land, whether irrigated or not, shall be charged with a minimum operation and maintenance charge which shall be the charge for one acre-foot of water.

6. An initial payment of \$3 per irrigable acre on account of the construction charge and \$1 per acre on account of the Indian cost of the land, shall be made at the time of making water-right application or entry of the farm unit. The remainder of the construction charge, \$57 per irrigable acre, shall be paid in 15 annual installments, the first five of which shall be \$3 each and the remainder \$4.20 each. The first of the said annual installments shall become due and payable on December 1 of the fifth calendar year after the initial installment, and subsequent installments shall become due on December 1 of each calendar year thereafter. Any water-right applicant may, if he so elects, pay the whole or any part of the construction charges owing by him within a shorter period. The balance of the payment on account of the Indian cost of the land shall be made in four equal

annual installments, the first of which shall be due on December 1 of the year following the date of entry.

7. In all cases where application for water right for lands in private ownership or lands held under entries not subject to the reclamation law shall not be made within one year after the date of this notice, the construction charges for such land shall be increased 5 per cent each year until such application is made and an initial installment is paid.

8. The operation and maintenance charge for the season of 1915 shall be based on the quantity of water delivered with a minimum charge per irrigable acre, whether water is used or not. The amount of such charge shall be hereafter announced and payment thereof will become due after the close of the irrigation season. The operation and maintenance charge for the irrigation season of 1915 will be due March 1, 1916. The method of determining the amount chargeable for operation and maintenance, and the penalties for failure to pay the construction charges and the operation and maintenance charges when due, are prescribed by act of Congress of August 13, 1914 (Public No. 170):

ANDRIEUS A. JONES,  
*First Assistant Secretary of the Interior.*

DEPARTMENT OF THE INTERIOR,  
*Washington, November 3, 1914.*

The COMMISSIONER, GENERAL LAND OFFICE.

SIR: It is directed that the farm units within the second unit of the Huntley reclamation project, in Montana, be opened to settlement and entry under the provisions of the reclamation act of June 17, 1902 (32 Stat., 388), and acts amendatory, and be settled upon, occupied and entered in the following manner and not otherwise:

1. *Application for registration.*—Any person who is qualified to make entry under the reclamation act may present an application for registration for any farm unit, which must be fully and specifically described according to legal subdivision, section, township and range, and also by farm unit description. An applicant must swear to his application before any qualified notary public and present the same for registration at the Billings, Mont., local land office, on November 23, or November 24, 1914, depositing at the time a sum equal to 5 per cent of the construction charge, plus \$1 per acre on account of the Indian price of the lands, for the unit applied for with the special fiscal agent of the United States Reclamation Service who will be at the Billings land office on the dates above fixed and thereafter at Huntley, Mont., and must deliver the application, properly executed to the officer in charge of the opening, or to some person designated by him to receive such application at Billings, Mont. The payment on account of the Indian price of the land will later be turned over to the receiver of the local land office, to whom will be paid all future installments on account thereof. No person shall be permitted to present an application for registration by agent or through the mail, or to present more than one application, or to swear to his application elsewhere than at Billings, or before or after the dates mentioned, and no person shall be permitted to present an application who is not qualified to make entry under the reclamation act.

2. *Form of deposit.*—The deposit required must be in cash, by a certified check on a national or State bank or trust company which can be cashed without cost to the Government, or by a post-office money order made payable to the said special fiscal agent. Payment will not be accepted in any other form.

3. *Examination of lands.*—Applicants may examine the lands before presenting their applications for registration, but will not be required to do so. Those who do not, and who secure the right to make entry, must examine the lands before presenting their applications to enter, as they must swear in those applications that they have examined and are familiar with each legal subdivision of land applied for.

4. *Plats for public inspection.*—A copy of each farm unit plat shall be conspicuously posted for public inspection, on which will be indicated the farm units for which applications have been presented during the period of registration.

5. *Drawing and dates for entries.*—A public drawing will be conducted at the said city of Billings beginning at 10 o'clock a. m., on November 25, 1914, at which not more than one application for each tract will be impartially drawn. If two or more applications were presented for any tract, before the application is drawn, each one shall be inclosed in a separate envelope which shall not indicate on the outside the name of the applicant. The name and address of each successful applicant, and a full and specific description of the tract applied for shall be publicly announced when the application is drawn.

6. *Notices to successful applicants.*—On the day of the drawing a notice will be mailed to each successful applicant, addressed to him at Billings, Mont., fully and specifically describing the tract applied for and stating that entry must be made November 30 or December 1, 1914. A copy of these regulations will be inclosed with the notice. An applicant will not be permitted to make entry after the time allowed on account of the miscarriage of his notice in the mails, or on account of any other delay.

7. *Return of deposits.*—As soon as possible after the drawing the special fiscal agent will return the deposits made by all persons whose applications were not selected and notify them that they were unsuccessful. No deposit will be returned until after collection has been made, if tender was in any form other than cash or post-office money order.

8. *Presentation of applications to enter.*—In order to make entry applicants must, on November 30 or December 1, 1914, present a properly executed application for water right to the project manager of the United States Reclamation Service at Huntley and a proper application to enter to the register and receiver of the United States Land Office at Billings. The application to enter may be sworn to before the register or the receiver, or before a United States commissioner or a judge or clerk of a court of record residing in the county in which the land is situated, or before any such officer who resides outside the county and in the Billings land district and is nearest and most accessible to the land. A certificate from the project manager showing that a proper application and the necessary payment for construction charges have been made, must be filed with the application



to enter. If an applicant must make any special showing, such as evidence of citizenship, or the right to make second entry, it must also be filed with the application to enter.

9. *Requirements of entrymen.*—Persons making entry of these units will be required to comply with all the terms and conditions of the homestead laws, and, before patents are issued, they will be required to reclaim one-half of the irrigable area of the land entered and to pay the Indian price for the land, the construction charge fixed in the public notice and the yearly operation and maintenance charge determined from time to time.

10. *Death of applicant.*—If any person dies after obtaining the right to make entry for any unit and before the time allowed for entry has expired, his widow or any one of his heirs may make entry in her or his own right, within the time allowed, but not thereafter. Where such entry is made the deposit made by the deceased applicant will be returned to his estate, and the person who makes entry must himself make the first payment on the construction charge for the unit applied for. Such person must furnish with his application to enter his affidavit, corroborated by the affidavit of at least one person, showing the fact and time of the successful applicant's death.

11. *Rejected applications.*—If an applicant applies to make entry within the time allowed, and the application is rejected by the register and receiver, subject to the right of appeal, the next applicant for that tract, if any, will be notified that he may, if he desires, present an application to enter it, subject to the right of the prior applicant under the rejected application.

12. *Form of application for registration.*—The following form is prescribed as the application for registration:

I, \_\_\_\_\_ of \_\_\_\_\_ (Street and number or other address.)

(City or town.) \_\_\_\_\_ (County.) \_\_\_\_\_ (State.) \_\_\_\_\_  
 age \_\_\_\_\_ years, height \_\_\_\_\_ feet \_\_\_\_\_ inches, and  
 weight \_\_\_\_\_ pounds, in support of this, my application for  
 registration for tract No. \_\_\_\_\_ or farm unit \_\_\_\_\_  
 embracing the \_\_\_\_\_ Section \_\_\_\_\_ Township \_\_\_\_\_  
 \_\_\_\_\_, No., Range \_\_\_\_\_ E., Montana  
 principal meridian, do solemnly swear that I am a citizen of the  
 United States, or have declared my intention to become such; that  
 I am not the owner of more than 160 acres of land, in the United  
 States, and have not heretofore made any entry or acquired any title  
 to public lands which disqualifies me from making entry under the  
 reclamation act; that I honestly desire to enter public lands for my  
 own personal use as a home and for settlement and cultivation, and  
 not for speculation or in the interest of some other person; that I  
 present this application for that purpose only, and have not pre-  
 sented and will not present any other affidavit of this kind.

The foregoing was subscribed and sworn to before me, after it was read to or by affiant, at Billings, Mont., \_\_\_\_\_, 1914.

*Notary Public.*

UNITED STATES RECLAMATION SERVICE,  
Huntley, Mont., -----, 1914.

The above-named applicant has deposited with me a sum equal to 5 per cent of the construction charge for the above-described unit, for which I have this day issued receipt No. ----- for \$-----.

-----  
*Special Fiscal Agent.*

13. *Units not entered under successful applications.*—The units which are not entered within the time allowed for entry by persons who were successful in the drawing, if any, will become subject to appropriation under laws applicable, by any qualified persons, at 9 o'clock a. m., on December 3, 1914.

Very respectfully,

A. A. JONES,  
*First Assistant Secretary.*

*Huntley project, Montana—Farm units in second unit.*

Town- ship.	Range.	Section.	Farm unit.	Irrigable area.	First payment account construc- tion charge.
				<i>Acres.</i>	
3 N.	30 E.	22	D	31	\$93
3 N.	30 E.	24	A	61	183
3 N.	30 E.	24	B	37	111
3 N.	30 E.	24	D	33	99
3 N.	30 E.	24	E	38	114
3 N.	30 E.	24	F	29	87
3 N.	30 E.	24	G	2	6
3 N.	31 E.	2	A	44	132
3 N.	31 E.	2	B	24	102
3 N.	31 E.	8	A	55	165
3 N.	31 E.	8	B	54	162
3 N.	31 E.	8	C	53	159
3 N.	31 E.	8	D	42	126
3 N.	31 E.	8	E	32	96
3 N.	31 E.	9	A	52	156
3 N.	31 E.	9	B	43	129
3 N.	31 E.	9	C	47	141
3 N.	31 E.	9	D	34	102
3 N.	31 E.	9	E	33	99
3 N.	31 E.	9	F	34	102
3 N.	31 E.	11	E	62	186
3 N.	31 E.	11	F	48	144
3 N.	31 E.	11	G	26	78
3 N.	31 E.	17	C	50	150
3 N.	31 E.	19	A	36	108

PUBLIC NOTICE DATED FEBRUARY 27, 1915.

1. Under the terms of existing public notices and orders, the operation and maintenance charges for the irrigation season of 1914 for the Huntley project, Montana, became due December 1, 1914.

2. In pursuance of the provisions of the reclamation act of June 17, 1902 (32 Stat., 388), and acts amendatory thereof and supplemental thereto, and in particular the reclamation extension act of August 13, 1914 (38 Stat., 686), section 6 of which authorizes the Secretary of the Interior to fix the due date for operation and maintenance charges, notice is hereby given that the operation and maintenance charge for the said project which under existing public notice became due December 1, 1914, is postponed to and shall become due on March 1, 1915,

and all operation and maintenance charges hereafter made against lands under the said project shall become due on March 1 of each year thereafter until further notice.

3. Hereafter no operation and maintenance charge shall be collected at the time water-right application is filed, but the first payment on account of operation and maintenance shall become due on March 1 of the year following the calendar year in which same was made; provided, however, that if original homestead entry or original water-right application be filed after June 15 in any year, the first payment on account of operation and maintenance will not become due until March 1 of the second calendar year following the date of entry.

4. For the operation and maintenance charge due March 1, 1915, no discount will be allowed for payment prior to such date, but penalties as prescribed by the extension act will attach. As to the operation and maintenance charges due March 1, 1916, and thereafter, the discount for payment made on or before the due date and the penalties for failure to make payment before the first day of the third calendar month after the due date will be applied as provided in section 6 of the said reclamation extension act. The penalties and discounts herein provided for attach for all lands, whether acceptances of the extension act have been filed or not.

5. Each acre of irrigable land, whether irrigated or not, shall be charged with a minimum operation and maintenance charge of 90 cents, which will permit delivery of not more than 1 acre-foot per acre. Additional water will be furnished at the rate of 60 cents per acre-foot.

6. The provisions of this public notice shall apply to all lands subject to public notice heretofore issued for the said project.

7. Except as hereinabove provided, all the terms and provisions of existing public notices and orders for the said project shall remain unchanged.

A. A. JONES,  
*First Assistant Secretary of the Interior.*

#### FINANCIAL STATEMENTS.

*Assets, liabilities, reserves, and capital, Huntley project, to June 30, 1915.*

##### ASSETS.

##### Accounts receivable:

Construction charges due and uncollected from water-right applicants.....	\$5,815.44
Construction charges unaccrued on contracts with water-right applicants.....	498,660.05
Operation and maintenance charges due and uncollected from water-right applicants.....	6,874.81
Uncollected contractors' freight refunds.....	82.11

Total..... \$511,432.41

##### Inventories:

Animals.....	1,257.00
Mechanical and other equipment.....	31,106.96
Material and supplies on hand in storehouses.....	36,016.96
Unadjusted transfers between projects.....	179.67
Undistributed cost (freight and handling on inventory property).....	579.18

Total..... 68,780.43

<sup>1</sup> Deduct.

## Construction work in process:

Gross expenditures for construction of project to date. \$991, 084. 40

Less revenues earned during construction, as follows:

Rentals of cottages.....	\$315. 00
Rentals of grazing lands.....	1, 100. 69
Rentals of telephones.....	406. 79
Contractors' freight refunds.....	7, 633. 45
Sale of town-site lots.....	37, 483. 83
Miscellaneous revenues.....	212. 00
Profits on hospitals.....	2, 191. 70

Total deductions..... 49, 343. 46

Net expenditures for construction of project to date..... \$941, 740. 94

Deferred operation and maintenance charges..... 424, 182. 93

Total assets..... 1, 946, 136. 71

## LIABILITIES, RESERVES, AND CAPITAL.

## Accounts payable:

Unpaid progress earnings under construction contracts.....	\$5, 703. 61
Unpaid labor.....	7, 758. 93
Unpaid purchases.....	4, 964. 45
Unpaid freight and express.....	4, 473. 37
Unpaid passenger fares.....	45. 26
Unpaid miscellaneous.....	851. 78

Total..... 23, 797. 40

## Reserves for repayment to reclamation fund of cost of project:

Value of construction contracts with water-right applicants.....	698, 048. 30
Value of construction contracts with water-right applicants temporarily suspended.....	53, 060. 42
Construction charges paid in advance by water-right applicants.....	5, 042. 52
Construction charges paid and forfeited by water-right applicants.....	3, 289. 68
Penalties on construction charges paid by water-right applicants.....	43. 76

Total..... 759, 484. 68

## Net investment:

Disbursements.....	\$1, 667, 531. 54
Transfers received from other projects.....	79, 978. 93
	1, 747, 510. 47

## Less—

Collections.....	424, 169. 39
Transfers issued to other projects.....	160, 486. 45
	584, 655. 84

Total..... 1, 162, 854. 63

Total liabilities, reserves, and capital investment of the Government..... 1, 946, 136. 71

*Functional feature costs of Huntley project to June 30, 1915.*

Examinations and surveys.....	\$19, 006. 79
Canal system.....	637, 948. 52
Lateral system.....	307, 313. 19
Permanent improvements and lands.....	17, 774. 89
Telephone system.....	9, 041. 01

Gross expenditures for construction of project to date..... 991, 084. 40

*Operating revenues and expenses, Huntley project, to June 30, 1915.***EXPENSES.**

Canal system:	
Operation.....	\$11,661.45
Maintenance.....	25,189.86
Lateral system:	
Operation.....	24,127.39
Maintenance.....	120,589.58
Drainage and flood-protection system, maintenance.....	3,376.06
Undistributed expenses, maintenance.....	10,060.10
Supplemental construction.....	335,638.15
Total.....	530,642.59

**REVENUES.**

Rentals of lands and buildings.....	3,627.80
Rentals of irrigating water.....	196.15
Rentals of telephones and tolls.....	2.35
Miscellaneous revenues.....	84.79
Operation and maintenance charges accrued on contracts with water-right applicants.....	100,854.92
Operation and maintenance charges paid in advance by water-right applicants.....	835.01
Operation and maintenance charges paid and forfeited by water-right applicants.....	851.83
Penalties collected on operation and maintenance water-right charges....	6.81
Deferred operation and maintenance revenues (carried to the debit side of assets and liabilities statement).....	424,182.93
Total.....	530,642.59

*Estimated cost of contemplated works, Huntley project, during fiscal year 1916.*

Canal system:	
15 minor structures, at \$74.46.....	\$1,117.00
Lateral system:	
700 cubic yards excavation, class 1, at 20 cents.....	\$140.00
830 minor structures, at \$14.33.....	11,896.00
Total.....	12,036.00
Drainage system:	
Open drains.....	18,047.00
Closed drains.....	57,760.00
Total.....	75,807.00
Operation and maintenance under public notice.....	28,113.00
Stores and other operations:	
Reimbursable accounts.....	2,927.00
Total.....	120,000.00

## **MONTANA, MILK RIVER PROJECT.**

W. W. SCHLECHT, project manager, Malta, Mont.

### **LOCATION.**

Counties: Teton, Hill, Blaine, Phillips, and Valley.

Townships: 34 to 37 N., R. 14 W.; 34 N., R. 15 W.; 37 N., Rs. 11 to 13 W.; 33 to 37 N., Rs. 10 to 13 E.; 27 to 33 N., Rs. 17 to 42 E., Montana meridian.

Railroads: Great Northern and Canadian Pacific.

Railroad stations and estimated population January 1, 1915: Browning; Havre, 5,000; Chinook, 1,400; Harlem, 700; Savoy, 80; Coburg, 60; Dodson, 400; Wagner, 60; Malta, 1,000; Saco, 700; Hinsdale, 500; Glasgow, 2,200 and Nashua, Mont., 350; Cardston and Woolford, Canada.

### **WATER SUPPLY.**

Source of water supply: St. Mary Lakes, Swift Current Creek, and Milk River.

Area of drainage basin: St. Mary Lakes and Swift Current Creek, 298 square miles; Milk River at Havre, 5,550 square miles; Milk River at Malta, 11,850 square miles; Milk River at Hinsdale, 20,150 square miles.

Annual run-off in acre-feet of St. Mary River (including Swift Current Creek): At Babb (298 square miles), 1902-1914—maximum, 830,000; minimum, 469,000; mean, 610,000. At international line (452 square miles), 1903-1914—maximum, 1,107,300; minimum, 514,100; mean, 720,200. Of Milk River: At Havre (5,550 square miles), 1898-1914—maximum, 426,000; minimum, 17,100; mean, 217,500. At Malta (11,850 square miles), 1903-1914—maximum, 647,000; minimum, 29,400; mean, 301,250. At Hinsdale (20,150 square miles), 1908-1914—maximum, 1,210,000; minimum, 146,500; mean, 549,800.

### **AGRICULTURAL AND CLIMATIC CONDITIONS.**

Area for which the service is prepared to supply water, season 1915: 39,674 acres.

Area under rental contracts, season 1915 (to June 30): 3,025 acres.

Length of irrigation season: From April 15 to October 1, 170 days.

Average elevation of St. Mary storage: 4,500 feet above sea level.

Average elevation of irrigable area: 2,200 feet above sea level.

Average annual rainfall on St. Mary storage: About 24 inches.

Average annual rainfall on irrigable area: At Havre, 35 years, 13.71 inches; 1914, 15.02 inches; at Malta, 9 years, 13.40 inches; 1914, 13.42 inches.

Range of temperature on irrigable area,  $-50^{\circ}$  to  $103^{\circ}$  F.

Character of soil of irrigable area: Sandy loam, clayey loam and some gumbo.

Principal products: Alfalfa and other fodder crops, grain, and vegetables.

Principal markets: Minneapolis and St. Paul, Minn., Great Falls, Mont., and local.

### **LANDS OPENED FOR IRRIGATION.**

No lands have been opened for irrigation by public notice. The irrigated area under rental contracts during 1911 was 2,074 acres; during 1912, 353 acres; during 1913, 2,545 acres; during 1914, 2,201 acres; and during 1915 to June 30, 3,025 acres.

### **CHRONOLOGICAL SUMMARY.**

Reconnaissance and preliminary surveys begun by the Reclamation Service in 1902.

Construction recommended by director March 7, 1903.

Construction conditionally authorized by Secretary March 14, 1903.

Construction of St. Mary storage unit recommended by board of engineers September 19, 1904.

Construction of St. Mary storage unit authorized by Secretary March 25, 1905.

Construction begun July 27, 1906.

Dodson diversion dam completed in January, 1910.

Treaty with Great Britain relating to distribution between Canada and the United States of the waters of St. Mary and Milk Rivers signed January 11, 1909, and proclaimed May 13, 1910.

Recommendations covering construction of the project approved by Secretary June 13, 1912.

Dodson North Canal completed in 1914.

Sherburne Lakes Reservoir begun June 29, 1914.

Vandalia diversion, Vandalia South, and Dodson South Canals completed in 1915.

Milk River unit 46 per cent completed June 30, 1915.

St. Mary storage unit 53 per cent completed June 30, 1915.

Entire project 49 per cent completed June 30, 1915.

### IRRIGATION PLAN.

The irrigation plan of the Milk River project provides for the storage of water in the Sherburne Lakes and the St. Mary Lakes, and its diversion through a canal 28.8 miles long, heading three-fourths of a mile below the reservoir and discharging into the North Fork of Milk River, thence flowing through Canada for 100 miles or more and returning to the United States; the storage of water in Nelson Reservoir south of Milk River and 14 miles northeast of Malta; the discharge of stored water into Milk River as required; the diversion of water from Milk River by a dam near Chinook into two canals, one on each side of the river, for the irrigation of lands near Chinook and Harlem, comprising the Chinook division; the diversion of water from Milk River by a dam near Dodson into two canals, the northside canal irrigating lands near Dodson, Wagner, and Malta, and the southside canal conveying water to Nelson Reservoir and irrigating lands near Wagner, Malta, Bowdoin, and Ashfield; the irrigation of lands on both sides of Milk River and Beaver Creek in the vicinity of Saco and Hinsdale from the stored waters of Nelson Reservoir, comprising the Malta division; and in the Glasgow division the diversion of water at Vandalia Dam into a canal on the south side of Milk River for the irrigation of lands near Tampico, Glasgow, and Nashua. In case the normal flow of Milk River at Vandalia Dam is not sufficient for the irrigation of lands in the Glasgow division, the stored waters in Nelson Reservoir will be returned to Milk River and diverted again at Vandalia Dam. The United States claims all waste, seepage, spring, and percolating water arising within the project, and proposes to use such water in connection therewith.

The features of the above irrigation plan which have been completed are: 24.5 miles of the St. Mary Canal, the Dodson and Vandalia diversion dams to the height of the fixed crest; headworks for the Dodson North, Dodson South, and Vandalia South Canals; 10 miles of the Dodson South Canal, with a capacity of 900 second-feet, including Point of Rocks equalizing reservoir, 34 miles with a capacity of 500 second-feet, and the lateral and waste-water systems to cover 15,000 acres; 28 miles of Dodson North Canal, with a capacity of 200 second-feet at its head, including the lateral and waste-water systems for 12,000 acres; 46 miles of Vandalia South Canal, with a capacity of 250 second-feet at its head, including the lateral and waste-water systems for 19,300 acres; and the first development of Nelson Reservoir to store 25,000 acre-feet.

The work under construction comprises the completion of railroad crossings on the Dodson South and Vandalia South Canals, the riprapping for the Dodson South Canal at Dodson Bridge, the drop from Nelson Reservoir to Milk River, the first unit of the Bowdoin Canal, and the Nelson Reservoir South Main Canal.

The principal features remaining to be completed are the St. Mary Lake and Sherburne Reservoirs, 4.4 miles of St. Mary Canal, and about 27 per cent of the structures; the Chinook division, comprising the diversion dam and the North and South Canals; Nelson Reservoir to its final development; Nelson Reservoir North and Ashfield Canals; second unit of the Bowdoin Canal; the lateral system for the Nelson Reservoir South Canal; and the permanent movable crest for the Dodson and Vandalia Dams.

## CONSTRUCTION DURING FISCAL YEAR.

## MILK RIVER PROJECT.

At Vandalia diversion the work pertaining to the structures was done by Government forces, but such portions of the excavation as were not directly necessary for the structures—that is, the auxiliary spillway channel and the protection of the Great Northern Railway—were done by contract. The closure of the dam was made during March and the structure, with the exception of the permanent movable crest, completed during June. Work on the first and second units of the Vandalia South Canal structures was done by contract under specifications Nos. 246 and 263 and was completed during April. Work at Vandalia Point under specification No. 264 was not completed, due to drainage works which had to be installed to prevent sliding of the foundation for the structure. Bids for the earthwork and structures of the first development of Nelson Reservoir, to store 25,000 acre-feet, were opened October 13 (specification No. 282) and work begun during November. This feature, with the exception of the drop into Milk River, is completed. Bids for the first contract of Nelson Reservoir South Canal under specification No. 301 were opened May 12, 1915, and preliminary work was begun during June. On Dodson South Canal work under specification No. 265, consisting of laterals and structures, was completed, with the exception of the stilling pool for the wasteway at station 1800. Bids for the Dodson South Canal repairs at Dodson bridge under specification No. 281 were opened October 28, 1914, and work begun during November. This work was completed with the exception of the placing of some riprap on the outside slopes of the canal. The contract for the second unit, Dodson North Canal, specification No. 241, for earthwork and structures, was completed during September, 1914. Temporary pile bridges necessary to carry the Great Northern Railway across the excavation for culverts for the Dodson South and Vandalia South Canal systems were built by the Great Northern Railway. Surveys for the flowage lands on Fort Belknap Indian Reservation for Dodson diversion and Dodson South Canal were completed. The overflowed lands were appraised and negotiations for the transfer from the Indian Department to the United States Reclamation Service practically completed.

## ST. MARY STORAGE UNIT.

The construction on the canal was accomplished by contract, except that after the suspension of the contract with the Midwest Engineering Co. the completion of the work was undertaken with Government forces. At Sherburne Lakes Reservoir Dam all construction work was accomplished with Government forces, except that a contract was awarded for logging and sawing 700,000 feet, b. m., of lumber to be used for construction purposes. At the end of the year the canal was 82 per cent completed and the dam 21 per cent.

The following contracts were in operation: J. E. Hilton for earthwork, schedules 1 and 3, and for backfilling over St. Mary pressure



pipe; Adelbert Cazier for earthwork, schedule 4; Midwest Engineering Co. for structures, schedules 8, 9, 10, 12 to 19, and 22; Condon & Williams for earthwork and structures, schedules 2a, 5, 7, 11, 20, and 21; James Brown for bridges, schedule 6, and for rafting logs; William Martin Williams for excavating for the St. Mary and Hall's Coulee pressure pipe; Minneapolis Bridge Co. for the construction of the highway and pipe bridge across St. Mary River at Fletcher; Chicago Bridge and Iron Works for the construction of the Hall's Coulee and St. Mary pressure pipes; Fisher and Andrews for sawing lumber.

On December 10 the Midwest Engineering Co. announced their intention of abandoning their contract and forthwith did so. On January 11 this contract was formally suspended and the completion of a portion of the work with Government forces was authorized. The remainder of the work was readvertised for proposals, but since no satisfactory bids were received, the completion of this with Government forces was also authorized. At the end of the year schedules 10 to 14 were nearly completed, schedule 18 completed, and work on schedule 17 begun. One hundred and seventy-six acres of flowage land around the foot of Lower St. Mary Lake were farmed to provide forage for Government stock. From this area 252 tons of hay were harvested.

At Sherburne Lakes Reservoir all necessary construction and camp buildings were built and plant assembled, including a large gravel-screening plant on Upper Sherburne Lake, the gravel from which will be transported to the dam site by floating equipment. The site of the dam and spillway was cleared and stripped; the trench for the outlet conduit was excavated; the concrete outlet conduit, except the gate tower and grillage structure, and the excavation and concreting of the down-stream 120 lineal-feet of spillway channel were completed. The total amount of excavation accomplished was 66,688 cubic yards, and 2,677 cubic yards of concrete were placed. The working program contemplates the completion of the dam for a storage capacity of 75,000 acre-feet during the fiscal year 1917.

#### OPERATION AND MAINTENANCE.

During 1914 the systems operated consisted of the upper ends of Dodson North Canal (10 miles) and of Dodson South Canal (18 miles). During 1915 the entire Dodson North Canal (29 miles) was operated and the Dodson South Canal to Alkali Creek. Due to the uncompleted work on the repairs to Dodson South Canal at Dodson bridge, the water supply for this system until July 4 was limited to the stored water in Point of Rocks Reservoir, amounting to about 250 acre-feet. No water was delivered under the Vandalia South Canal due to uncompleted work at Vandalia Point.

The season of 1914 was noteworthy for its very low rainfall until June 4, amounting to but 1.64 inches; its heavy rainfall from June 4 to 30, amounting to 7.07 inches; and the light rainfall for the remainder of the year, amounting to 4.70 inches. The first portion of the 1915 season was dry, rainfall to May 13 aggregating 1.97 inches, but after May 13 the rainfall was sufficient for the growing of all crops except alfalfa, being 6.67 inches from May 13 to June 30.

During 1914 the water supply which, until the completion of St. Mary storage, is derived from the flood flow of Milk River, was far below the requirements, no water being available during the latter part of May and first part of June, and then again during August and September. During 1915 the flow during the first part of May was deficient, but after the rainy period of May the supply exceeded the requirements and water was wasted over the dam. Up to June 30, 54 applications for irrigation water service had been received, to be applied to 3,025 acres of land.

*Historical review, Milk River project.*

Item.	1911	1912	1913	1914	<sup>1</sup> 1915
Acres for which service was prepared to supply water.....	7,800	7,800	12,800	13,440	39,674
Acres irrigated.....	2,074	353	2,545	2,201	5,000
Number of farms irrigated.....	29	9	41	38	70
Miles of canal operated.....	30	30	59	53	75
Water diverted (acre-feet).....	11,160	2,885	4,863	4,229	7,000
Water delivered to land (acre-feet).....	2,853	293	2,349	1,760	5,000
Per acre of land irrigated (acre-feet).....	1.38	0.82	0.92	0.80	1.00

<sup>1</sup> Estimated.

**SETTLEMENT.**

As no public notice announcing the opening of the project has been issued, no material progress has been made in settlement, although several transfers have been made of deeded lands. There are several large holdings of land, but as yet little has been done toward subdividing and selling the excess holdings. Water is being delivered to homestead lands in the Dodson units on a rental basis.

*Settlement data of irrigated district, Milk River project.*

Item.	1913	1914	<sup>1</sup> 1915
Total number of farms on project.....	62	60	120
Population of.....	126	130	340
Number of irrigated farms.....	41	37	70
Operated by owners or managers.....	32	25	50
Operated by tenants.....	9	12	20
Population of.....	90	120	210
Number of towns.....	3	3	3
Population of.....	900	1,105	1,460
Total population in towns and on farms.....	1,026	1,235	1,800
Number of public schools.....	4	5	6
Number of churches.....	5	6	6
Number of banks.....	2	3	3
Total capital stock.....	\$75,000	\$95,000	\$95,000
Total amount of deposits.....	\$450,000	\$530,000	\$600,000
Total number of depositors.....	1,400	1,700	1,800

<sup>1</sup> Estimated.

**PRINCIPAL CROPS.**

Grain occupied 56 per cent and fodder crops 43 per cent of land cropped under irrigation in 1914. The crop results from these lands follow:

*Crop report of irrigated lands on Milk River project, Montana, year of 1914.*

Irrigated crop.	Area, acres.	Unit of yield.	Yields.		Values.		
			Total.	Average per acre.	Per unit of yield.	Total.	Per acre.
Alfalfa.....	322	Tons.....	604	1.9	\$11.00	\$6,644	\$20.63
Alfalfa seed.....	3	Bushels...	5	2	9.00	45	15.00
Barley.....	112	do.....	645	6	.55	355	3.17
Flax.....	55	do.....	230	4	1.22	281	5.10
Garden.....	2	.....	.....	.....	.....	400	200.00
Hay.....	616	Tons.....	479	0.8	12.00	5,748	9.34
Oats.....	405	Bushels...	13,947	34	.70	9,763	24.11
Pasture.....	5	.....	.....	.....	.....	60	10.00
Potatoes.....	14	Bushels...	2,633	188	1.00	2,633	188.07
Wheat.....	629	do.....	9,158	15	.95	8,700	13.82
Total acreage cropped under irrigation.....	2,163	Total and average.....				34,618	16.00
Irrigated, not cropped.....	38						
Grand total irrigated....	2,201						

Areas.	Acres.	Farms.	Per cent of project.
Total irrigable area farms reported.....	9,657	60	5.3
Total irrigated area farms reported: Under rental contracts.....	2,201	36	1.2
Total cropped area farms reported.....	14,257	46	2.3

<sup>1</sup> Includes 2,094 acres cropped by dry farming.

*Crop report of lands dry farmed on Milk River project, Montana, year of 1914.*

Crops.	Area, acres.	Unit of yield.	Yields.		Values.		
			Total.	Average per acre.	Per unit of yield.	Total.	Per acre.
Alfalfa.....	214	Tons.....	155	0.7	\$11.00	\$1,705	\$7.97
Barley.....	198	Bushels...	1,074	5	.55	591	2.98
Flax.....	64	do.....	.....	.....	1.22	.....	.....
Garden.....	5	.....	.....	.....	.....	700	140.00
Hay.....	431	Tons.....	140	.3	12.00	1,680	3.90
Oats.....	558	Bushels...	7,498	13	.70	5,248	9.41
Pasture.....	50	.....	.....	.....	.....	400	8.00
Potatoes.....	1	Bushels...	100	100	1.00	100	100.00
Wheat.....	573	do.....	6,345	11	.95	6,028	10.52
Total acreage cropped by dry farming.....	2,094	Total and average.....				16,452	7.86

Areas.	Acres.	Farms.	Per cent of project.
Total irrigable area farms reported.....	9,657	60	5.3
Total irrigated area farms reported: Under rental contracts.....	2,201	36	1.2
Total cropped area farms reported.....	14,257	46	2.3

<sup>1</sup> Includes 2,163 acres cropped under irrigation.

## FINANCIAL STATEMENTS.

*Assets, liabilities, reserves, and capital, Milk River project, to June 30, 1915.*

## ASSETS.

Cash in fiscal agents possession awaiting remittance.....		\$1, 376. 40
Account receivable:		
Uncollected freight refunds.....	\$263. 90	
Uncollected water rentals.....	17. 00	
Uncollected rental of grazing land.....	50. 00	
Uncollected miscellaneous.....	103. 75	
		434. 65
Inventories:		
Mercantile stores stock on hand.....	2, 219. 60	
Animals.....	4, 288. 08	
Mechanical and other equipment.....	13, 565. 63	
Materials and supplies on hand in storehouses.....	10, 916. 52	
Unadjusted transfers between projects.....	1, 215. 85	
Undistributed credit (freight and handling on inventory property).....	1 488. 60	
Total.....		31, 717. 08
Construction work in process:		
Gross expenditures for construction of project to date.....	2, 474, 451. 39	
Less revenue earned during construction as follows:		
Rental of cottages.....	\$1, 213. 28	
Rentals of grazing land.....	1, 582. 00	
Rentals of irrigating water.....	8, 687. 47	
Miscellaneous revenues.....	158. 75	
Contractors freight refunds.....	14, 154. 00	
Forfeiture by defaulting bidders and contractors.....	1, 660. 26	
Profits on messhouses.....	4, 229. 04	
Profits on mercantile stores.....	3, 440. 72	
Profits on hospitals.....	956. 39	
Adjustments—		
Profits shown on Government animals.....	196. 63	
Total deductions.....	36, 278. 54	
Net expenditure for construction of project to date.....		2, 438, 172. 85
Total assets.....		2, 471, 700. 98

## LIABILITIES, RESERVES, AND CAPITAL.

Accounts payable:		
Unpaid labor.....	\$41. 60	
Unpaid purchases.....	27, 703. 10	
Unpaid progress earnings under construction contracts.....	21, 733. 59	
Unpaid contract holdbacks.....	15, 371. 30	
Unpaid freight and express charges.....	6, 539. 44	
Unpaid passenger fares.....	313. 00	
Unpaid agreements to purchase real estate.....	24, 687. 05	
Unredeemed coupon books.....	38. 50	
Unpaid miscellaneous.....	440. 96	
Total.....		96, 868. 54
Net investment:		
Disbursements.....	\$2, 316, 258. 54	
Transfers received from other projects.....	124, 490. 22	
		2, 440, 748. 76
Less—		
Collections.....	32, 673. 05	
Transfers issued to other projects.....	33, 243. 27	
		65, 916. 32
Total.....		2, 374, 832. 44
Total liabilities, reserves, and capital investment of the Government.....		2, 471, 700. 98

<sup>1</sup> Deduct.

*Functional feature cost of Milk River project to June 30, 1915.*

Examination and surveys.....	\$71,409.27
Storage system.....	44,757.65
Canal system.....	1,820,423.34
Lateral system.....	369,273.87
Drainage system.....	100,000.00
Farm units.....	5,556.27
Permanent improvements and land.....	17,850.44
Operation and maintenance during construction.....	43,334.97
Stores and other operations.....	1,845.58
Gross expenditures for construction of project to date.....	2,474,451.39

*Estimated costs of contemplated work, Milk River project, during fiscal year 1916.*

Examination and surveys.....	\$5,000.00
Storage system:	
Nelson Reservoir.....	13,970.00
Canal system:	
Preliminary and general.....	\$13,840.00
Diversion dam.....	63,912.36
Headworks.....	13,270.00
Main canals.....	165,020.00
Flumes.....	12,300.00
Bridges.....	1,340.00
Siphons.....	8,650.00
Wasteways.....	18,620.00
Plant and equipment.....	4,000.00
	300,952.36
Lateral system:	
Preliminary and general.....	6,000.00
Headworks.....	20,350.00
Laterals and sublaterals.....	27,600.00
Plant and equipment.....	600.00
	54,550.00
Drainage system.....	3,000.00
Flood protection.....	2,000.00
Farm units.....	4,500.00
Permanent improvements and land.....	6,000.00
Telephone system.....	4,900.00
Operation and maintenance during construction.....	23,000.00
Stores and other operations—Reimbursable accounts.....	4,450.00
Total.....	422,322.36

*Assets, liabilities, reserves and capital, St. Mary storage unit, to June 30, 1915.*

## ASSETS.

Cash in fiscal agents' possession awaiting remittance.....	\$178.18
Accounts receivable:	
Uncollected freight refunds.....	\$3,983.75
Uncollected miscellaneous items.....	182.43
	4,166.18
Inventories:	
Mercantile stores, stock on hand.....	841.58
Animals.....	41,403.59
Mechanical and other equipment.....	64,623.12
Materials and supplies.....	101,590.43
Unadjusted transfers between projects.....	922.05
Undistributed cost (freight and handling on inventory property).....	<sup>1</sup> 10.10
	209,370.67
Construction work contracted:	
Unearned value of construction work contracted.....	257,683.24

<sup>1</sup> Deduct.

## Construction work in process:

Gross expenditures for construction of project to date. \$1, 470, 882. 58

Less revenue earned during construction, as follows:

Rentals of buildings.....	\$10, 311. 99
Rentals of telephones.....	619. 05
Contractors' freight refunds.....	6, 495. 90
Forfeitures by defaulting bidders....	3, 223. 22
Miscellaneous revenues.....	8. 50
Profit on mess house.....	4, 792. 61
Profit on mercantile store.....	5, 000. 40
Profit on hospital.....	2, 305. 47

Total deductions..... 32, 757. 14

Net expenditures for construction of project to date ..... \$1, 438, 125. 44

Total assets..... 1, 909, 523. 71

## LIABILITIES, RESERVES, AND CAPITAL.

## Accounts payable:

Unpaid progress earnings under construction contracts .....	\$40, 727. 38
Unpaid contract holdbacks.....	50, 879. 74
Unpaid labor.....	20, 021. 64
Unpaid purchases.....	20, 695. 79
Unpaid freight and express charges.....	11, 362. 47
Unpaid passenger fares.....	524. 51
Unredeemed coupon books.....	247. 70

Total..... 144, 459. 23

## Contingent obligations:

Unearned value of construction work contracted..... 257, 683. 24

## Net investment:

Disbursements.....	\$1, 424, 200. 95
Transfers received from other projects.....	186, 051. 33
	1, 610, 252. 28

Collections.....	48, 402. 30
Transfers issued to other projects .....	54, 468. 74
	102, 871. 04

Total..... 1, 507, 381. 24

Total liabilities, reserves and capital investment of the Government..... 1, 909, 523. 71

*Functional feature costs of St. Mary storage unit to June 30, 1915.*

Examinations and surveys.....	\$39, 676. 26
Storage system.....	185, 162. 40
Canal system.....	1, 023, 154. 33
Power system.....	4, 900. 98
Permanent structures and land.....	196, 551. 00
Telephone system.....	14, 271. 60
Stores and other operations.....	7, 166. 01

Total..... 1, 470, 882. 58

*Estimated cost of contemplated work, St. Mary storage unit, during fiscal year 1916.*

Examinations and surveys.....	\$1, 320. 00
Storage system.....	207, 709. 40
Canal system.....	186, 760. 60
Permanent improvements and land.....	19, 649. 00
Telephone system.....	425. 00
Operation and maintenance during construction.....	14, 960. 00
Stores and other operations—reimbursable accounts.....	31, 309. 00
Unallotted to features.....	11, 867. 00

Total..... 474, 000. 00

## MONTANA, SUN RIVER PROJECT.

CHARLES P. WILLIAMS, project manager, Fort Shaw, Mont.

### LOCATION.

Counties: Teton, Lewis and Clark, Choteau, Cascade.

Townships: 20 to 25 N., Rs. 6 E. to 8 W., Montana meridian.

Railroad: Great Northern.

Railroad stations and estimated population January 1, 1915: Vaughn;<sup>1</sup> Largent;<sup>1</sup> Sun River, 34; Fort Shaw, 86; Simms, 100; Riebling;<sup>1</sup> Gilman, 180; Power, 52; Cordova;<sup>1</sup> Sloan;<sup>1</sup> and Bole.<sup>1</sup>

### WATER SUPPLY.

Source of water supply: Sun River and tributaries, Deep Creek, Bowl Creek, and Basin Creek.

Area of drainage basins: Sun River, 1,070 square miles; Deep Creek, 260 square miles; Bowl Creek, 9 square miles; Basin Creek, 15 square miles.

Annual run-off in acre-feet: North Fork of Sun River, near Augusta, 1905-1914, maximum, 808,000; minimum, 378,000; mean, 630,400. Willow Creek, near Augusta, 1906-1914, maximum, 35,300; minimum, 7,900; mean, 18,300. Sun River, at Sun River, 1906-1914, maximum, 1,140,000; minimum, 390,000; mean, 806,000. South Fork of Sun River, near Augusta, 1905-1914, maximum, 147,000; minimum, 28,000; mean, 73,000.

### AGRICULTURAL AND CLIMATIC CONDITIONS.

Area for which the service is prepared to supply water, season of 1915: 16,346 acres.

Area under water-right applications, season of 1915: 10,748 acres.

Area under rental contracts, season of 1915: 588 acres.

Length of irrigating season: From May 15 to October 1, 138 days.

Average elevation of irrigable area: 3,700 feet above sea level.

Average annual rainfall on irrigable area for 27 years: 10.82 inches; 1914, 10.83 inches.

Range of temperature on irrigable area: -40° to 100° F.

Character of soil of irrigable area: Sandy loam, clay, adobe, and alluvium.

Principal products: Hay, grain, and vegetables.

Principal markets: Great Falls, Helena, and Butte, Mont.

### LANDS OPENED FOR IRRIGATION.

Dates of public notices: March 26, 1908; November 19, 1910; March 28, 1911; March 2 and July 13, 1912; June 23, 1913; March 20 and March 26, 1915.

Location of lands opened: Tps. 20 and 21 N., Rs. 1 to 3 W., Montana meridian.

Present status of irrigable lands opened: 10,421 acres entered subject to the reclamation act; 2,716 acres open to entry; 281 acres of State lands; 1,693 acres in private ownership which have not applied for water; 206 acres in private ownership which have applied for water.

Limit of area of farm units: 160 acres.

Duty of water: 2 acre-feet per acre per annum at the farm.

Building charge per acre of irrigable land: \$30 and \$36.

Annual operation and maintenance charge: 90 cents per acre of irrigable land, entitling the water user to 1 acre-foot per acre, with an additional charge of 75 cents for each additional acre-foot of water used.

### CHRONOLOGICAL SUMMARY.

Reconnaissance made and preliminary surveys begun in 1905.

Construction recommended by board of engineers February 13, 1906.

<sup>1</sup> Population less than 25.

Construction authorized by Secretary February 26, 1906.  
Fort Shaw main canal completed July, 1908.  
First irrigation by Reclamation Service season of 1909.  
Fort Shaw unit completed December, 1909.  
Willow Creek Dam completed, present development, November 7, 1911.  
Sun River Diversion Dam completed March, 1915.  
Entire project 26.8 per cent completed June 30, 1915.

### IRRIGATION PLAN.

The irrigation plan of the Sun River project, so far as approved, provides for the storage of water in Sun River storage reservoir on the North Fork of Sun River; in the Willow Creek Reservoir, on Willow Creek; in Pishkun Reservoir, north of Sun River; the diversion of water from the North Fork of Sun River through supply canals for the Willow Creek and Pishkun Reservoirs; the diversion of water from Sun River, supplemented by stored waters released from Sun River storage and Willow Creek Reservoirs, into a canal system watering lands mainly in the abandoned Fort Shaw Military Reservation; and the diversion of water from Pishkun Reservoir into Sun River Slope Canal, supplying water for lands in the Sun River Valley.

Possible future development may include the diversion of water from Bowl and Basin Creeks, tributaries of Flathead River, across the Continental Divide to Sun River drainage; the diversion of flood waters from Deep Creek into Pishkun Reservoir; the storage of water in the Benton Lake Reservoir for the irrigation of lands lying north of Great Falls; and the diversion of water from the Sun River for the irrigation of lands lying west of Great Falls.

The United States claims all waste, seepage, spring, and percolating water arising within the project, and proposes to use such water in connection therewith.

The Fort Shaw Unit, the Willow Creek Reservoir (first development, 16,700 acre-feet), and the Sun River Diversion Dam are completed. The Pishkun Reservoir Supply Canal, the Sun River Slope Main Canal, and the Greenfields, South Greenfields, and Mill Coulee Main Canals are under construction and will be completed during the working season of 1915. Advertisement has been issued for the construction of laterals and structures for the irrigation of about 25,000 acres in the Greenfields unit, and proposals for this work will be received July 1, 1915.

### CONSTRUCTION DURING FISCAL YEAR.

*Sun River Diversion Dam.*—The Sun River Diversion Dam and the controlling works at the head of the Pishkun Reservoir Supply Canal were completed by Government forces.

*Pishkun Reservoir Supply Canal, and Sun River Slope Canal.*—Work has been in progress on the construction of the Pishkun Reservoir Supply Canal, station 8+60 to station 38+53, under contract No. 610 with Bates & Rogers Construction Co. of Spokane, Wash. This contract includes the construction of 840 linear feet of rectangular concrete conduit having interior dimensions of 9 feet 6 inches by 11 feet, and a capacity of 1,400 second-feet, and constructed in open cut, 80 linear feet of concrete-lined transition section of open canal, and 2,083 linear feet of open earth canal, having a capacity of 1,400 second-feet. The contract requires the completion of this work on or before August 15, 1915. On June 30, 1915, the work was about 45 per cent completed.

Work has been in progress throughout the year under contract No. 511 with MacArthur Bros. Co., of New York. This work includes the excavation of the Pishkun Reservoir Supply Canal from Sun River Crossing to the end at Pishkun Reservoir, a distance of about 11 miles; the excavation and lining of tunnels 2 and 3 of this canal; and the excavation of the Sun River Slope Canal from its head at Pishkun Reservoir to the end, a distance of about 34 miles. The Pishkun Reservoir Supply Canal from Sun River Crossing to Pishkun Reservoir is designed for an ultimate capacity of 2,500 second-feet and the



Sun River Slope Canal for 1,000 second-feet. They are being constructed under this contract with capacities of 1,000 second-feet and 500 second-feet, respectively. On June 30, 1915, there had been completed about 33 miles of canal, including the excavation and partial lining of 3,215 linear feet of tunnel. About 13 miles of canal remain to be excavated to complete this contract. On June 30, 1915, the work under the contract was about 90 per cent completed, and all work probably will be completed by the end of the working season of 1915. The greater part of the canal excavation included in this contract has been performed by the means of one class 20 and one class 24 Bucyrus electric drag-line excavator.

The structures on the Pishkun Reservoir Supply Canal, except tunnels Nos. 2 and 3 and the structures on the Sun River Slope Canal, are being constructed under contract No. 532 with Hayden Bros., of Portland, Oreg. Work under this contract has been in progress throughout the year. On June 30, 1915, the work included in the contract was about 72 per cent completed. The required time of completion of the contract is October 30, 1915, and the present rate of progress, if maintained, will complete the work before that date.

*Greenfields, South, and Mill Coulee Canals.*—On December 22, 1914, proposals were received for the excavation of the Greenfields, South, and Mill Coulee Canals, receiving water from the Sun River Slope Canal and supplying about 65,000 acres of the Greenfields Unit. The lowest bidders on this work were O'Conner & Helean, of Great Falls, Mont., and the work was awarded to them, contract for the work being dated February 2, 1915. The contractors began work March 22, 1915. On June 30, 1915, the work had been about 51 per cent completed.

*Electric energy.*—Under contract dated February 19, 1913, and which became effective September 30, 1913, electric energy is purchased by the United States from the Great Falls Power Co. and is supplied to the contractors on Pishkun Reservoir Supply Canal and Sun River Slope Canal for the operation of machinery and for such other purposes in connection with the contract for which electric energy is required. The price charged contractors for electric energy ranges from 1 cent to 1.2 cents per kilowatt hour. The contract between the United States and the power company provides for a minimum total payment by the United States during six years after the contract became effective of \$60,000. The total use under the contract to June 30, 1915, amounted to about \$15,000. The power company has constructed a transmission line from its Rainbow Falls plant to the site of the Sun River Diversion Dam and delivers energy to the United States at three substations along this line at a voltage of 48,600. The United States has constructed a transmission line connecting with the various substations and extending along the canal line, and delivers energy to the contractors at 16,500 volts.

#### OPERATION AND MAINTENANCE.

The irrigation season on the Fort Shaw Unit for the year 1914 began May 1 and ended October 10. One hundred and ten miles of canals and laterals were operated, 11,468 acre-feet of water being delivered to 172 different farms. The duty of water amounted to

1.73 acre-feet per acre, an increased use of 0.23 acre-foot over that of the season of 1913.

On account of adverse action taken by the water users' association the rotation system of delivery was not adopted. Water was delivered as requested by the users, and in order to supply all demands during a short period in July, the amount diverted through the main canal was 255 second-feet, being about 60 second-feet more than the amount carried by that conduit at any previous time, and 80 second-feet more than its designed capacity. Storage in Willow Creek Reservoir amounted to 15,100 acre-feet, but as there was an abundance of water in Sun River no use was made of storage water. The acreage affected by seepage was about the same as in 1913, amounting to about 2,300 acres. Aside from a few preliminary investigations no action was taken regarding the reclaiming of the seeped areas.

Beginning with the irrigation season of 1915, water is being delivered on the acre-foot basis. A flat charge of 90 cents per acre of irrigable land entitles the water user to 1 acre-foot per acre of irrigable land. Additional water is furnished at the rate of 75 cents per acre-foot. In order to reduce the quantity of water used, larger and more permanent head ditches have been constructed by many of the farmers in order that they can use irrigation water to better advantage. The area irrigated during May, which was a very dry month, amounted to about 2,900 acres, 90 per cent of which was in alfalfa. Owing to the considerable rainfall and the lack of drying winds there was but little demand for water during June.

The principal maintenance work consisted in raising and strengthening stretches of the main canal and lateral banks, constructing a dam across an old channel of Sun River for protecting certain farm units, constructing short laterals for farm units recently filed on, and the installing of weirs and other measuring devices.

*Historical review, Sun River project.*

Item.	1910	1911	1912	1913	1914	<sup>1</sup> 1915
Acreage for which service was prepared to supply water.	16,000	16,346	16,346	16,346	16,346	16,346
Acreage irrigated.....	4,194	6,892	6,824	7,419	6,613	6,100
Miles of canal operated.....	105	121	121	121	110	110
Water diverted.....acre-feet..	30,499	24,192	20,392	20,566	24,762	18,900
Water delivered to land.....do....	9,707	11,380	11,688	11,187	11,468	7,400
Per acre of land irrigated.....do....	2.3	1.65	1.71	1.5	1.73	1.00

<sup>1</sup> Estimated.

**SETTLEMENT.**

During the fiscal year ending June 30, 1915, there were 13 homestead entries made under the reclamation act, 6 relinquishments, 3 cancellations, and 15 transfers of title. There has been a material change in conditions on the project during the past year. The majority of the farmers have effected permanent improvements, and a decidedly optimistic feeling prevails. The number of transfers of property has been due partly to the fact that some entrymen filed with the intent of obtaining title to land in order that it could be disposed of at a profit.

The cheese factory established at Fort Shaw in November, 1913, and owned and operated by a local organization known as the Sun

River Valley Producers' Association, has continued in operation during the entire year. The development of the dairy business has resulted in raising the grade of cattle on the project by valuable additions of pedigreed stock. The class of hogs also has been improved by shipments of high-grade class for breeding purposes, some of which were purchased at the Montana State Fair at Helena.

The grange has a fairly active organization at Fort Shaw and the American Society of Equity, with a considerable membership, has an organization at Simms. An agriculturist in the employ of the State has aroused considerable interest in better farming, especially as regards intensive cultivation.

*Settlement data, Fort Shaw unit, Sun River project.*

Item.	1912	1913	1914	1915
Total number of farms on project.....	196	195	199	203
Population of.....			523	545
Number of irrigated farms.....	176	179	172	173
Operated by owners or managers.....	146	141	159	160
Operated by tenants.....	30	38	13	13
Population of.....			490	495
Number of towns.....	3	3	3	3
Population of.....			203	220
Total population in towns and on farms.....			726	765
Number of public schools.....	4	4	4	4
Number of churches.....	1	3	3	3
Number of banks.....			1	1
Total capital stock.....			\$20,000	\$20,000
Total deposits.....				\$44,000
Total depositors.....				300
Number of relinquishments.....	4	6	3	6
Number of cancellations.....	5	1	5	3
Homestead entries.....		6	4	13

**PRINCIPAL CROPS.**

The total value of all irrigated crops on the project for 1914 amounted to about \$106,500. While the total acreage cropped was about the same as in 1913, the acreage of the three or four leading crops varied considerably. Alfalfa became the chief crop, having increased 1,094 acres, or 67½ per cent, compared to the year 1913. Owing to a cold backward spring, which reduced the yield of the first crop, the average only slightly exceeded 2 tons per acre, but the quality was fine, and, considering the fact that about one-third of the acreage was new seeding, the results were satisfactory. The average yield per acre of alfalfa was reduced also by a pest called the "looper," which made its appearance on a number of farms in June and did much damage to the first crop. The oat crop was second in importance, the acreage falling off about 19 per cent, with a small increase in the yield per acre. Many farmers tried to handle too large an acreage, and the help of good irrigators being extremely scarce, a considerable percentage of the early oats was injured by the drouth in July, the oats requiring water at the same time that it was necessary to put up alfalfa. Late oats made much the better yield and served to raise the average per acre. The total acreage of wheat decreased from 943 acres to 523; however, there was an increase in the average production amounting to about 3 bushels per acre. Stock increase on the project stimulated the raising of barley, the acreage increasing about 57 per cent. Potatoes com-

pared to 1913 showed a falling off in acreage of nearly one-third, with about a similar increase in the production per acre.

The prices for all crops, especially hay, were well maintained. Baled alfalfa opened at \$8.50 per ton. About 60 per cent of the crop sold for \$9.25 per ton and some brought as high as \$10 per ton. Oats sold from the machine at \$1.20 per hundred, the price gradually increasing until late in the spring, when it reached \$1.75 to \$2 per hundred. Barley was strongly in demand, with the price ranging from \$1.25 to \$1.75 per hundred. Wheat sold high. In valuing this crop it was estimated at 90 cents per bushel, but the local price about January 1 was \$1 per bushel. Potatoes produced better than in previous years, and, with the price ranging from \$1 to \$2 per bushel, proved to be a profitable crop.

Due to a long period of very cool weather in May and June of this year the first crop of alfalfa was short. About the time for the first cutting frequent rains occurred, with the result that about 80 per cent of the crop was ruined and practically none of it is marketable. The second crop is well along and promises a very fair production. Indications are that all kinds of grain and potatoes will exceed the average production of last year. Unless a period of hot, dry winds should follow the present wet weather, neither crop will require irrigation.

*Crop report, Sun River project, Montana, year of 1914.*

Irrigated crop.	Area (acres).	Unit.	Yields.		Values.		
			Total.	Average per acre.	Per unit.	Total.	Per acre.
Alfalfa.....	2,627	Tons.....	5,471½	2.08	\$6.50	\$35,563	\$13.52
Oats.....	2,123	Bushels.....	63,312	29.8	.50	31,656	14.92
Wheat.....	517.5	do.....	11,342½	21.9	.90	10,208	19.72
Barley.....	376	do.....	9,407½	25.02	.70	6,585	17.52
Potatoes.....	114.5	do.....	15,480	135.2	.60	9,288	81.12
Timothy hay.....	99	Tons.....	80½	.81	10.00	805	8.13
Other hay.....	207	do.....	222½	1.08	8.09	1,801	8.69
Garden.....	78					7,758	99.46
Rye.....	14	Bushels.....	264	18.85	.736	194	13.87
Alfalfa seed.....	10	do.....	23½	2.37½	10.63	253	25.25
Millet seed.....	4	do.....	97	24.50	1.00	97	24.25
Peas (field).....	5.5	do.....	165	30	1.00	165	30.00
Beans.....	.75	do.....	24	32	2.67	64	85.33
Beets (mangels).....	3	Tons.....	13	4.33½	5.64	72	24.00
Beets (sugar).....	1.5	do.....	21½	14.33½	5.46½	117	78.33
Corn.....	1	Bushels.....	85	.80	.80	68	68.00
Apples.....	.5	do.....	9	18	1.50	13	26.00
Small fruit.....	.75					50	66.67
Pasture.....	377.5					1,837	4.87
Total cropped acreage.....	6,560.5	Total and average.....				106,594	16.25
Irrigated, no crop:							
Sod, summer fallow, etc.....	18.5						
Town lots, camps, etc.....	34						
Grand total irrigated.....	6,613						

Areas.	Acres.	Farms.	Per cent of project.
Total irrigable area farms reported.....	8,320	172	50.9
Total irrigated area farms reported:			
Under water right applications.....	6,408	168	39.2
Under rental contracts.....	171	4	1.0
Total cropped area farms reported.....	6,560½	172	40.1

**PUBLIC NOTICE DATED MARCH 26, 1915.**

1. Under the terms of existing public notices and orders, the operation and maintenance charges for the Fort Shaw unit, Sun River project, Montana, become due March 1 of each year, in advance.

2. In pursuance of the provisions of the reclamation act of June 17, 1902 (32 Stat., 388), and acts amendatory thereof and supplemental thereto, and in particular the reclamation extension act of August 13, 1914 (38 Stat., 686), section 6 of which authorizes the Secretary of the Interior to fix the due date for operation and maintenance charges, notice is hereby given that the operation and maintenance charges for the said project which, under existing public notices, will become due March 1, 1915, are advanced to and shall become due on March 1, 1916, and all operation and maintenance charges hereafter made against lands under the said project shall become due on March 1 of each year thereafter until further notice.

3. Hereafter no operation and maintenance charge shall be collected at the time water-right application is filed, but the first payment on account of operation and maintenance shall become due on March 1 of the year following the calendar year in which entry or water-right application was made: *Provided, however,* That if original homestead entry or original water-right application be filed after June 15 in any year, the first payment on account of operation and maintenance will not become due until March 1 of the second calendar year following the date of entry.

4. The discount for payment made on or before the due date and the penalties for failure to make payment before the first day of the third calendar month after the due date will be applied as provided in section 6 of the said reclamation extension act.

5. The operation and maintenance charges for the irrigation season of 1915 shall be due March 1, 1916, and each acre of irrigable land, whether irrigated or not, shall be charged with a minimum operation and maintenance charge of 90 cents, which will permit delivery of not more than 1 acre-foot per acre. Should further quantities be needed they will be furnished at the rate of 75 cents per acre-foot.

6. The provisions of this public notice shall apply to all lands subject to public notice heretofore issued for the said project.

7. Except as hereinabove provided all the terms and provisions of existing public notices and orders for the said project shall remain unchanged.

A. A. JONES,  
*First Assistant Secretary.*

## FINANCIAL STATEMENTS.

*Assets, liabilities, reserves, and capital, Sun River project, to June 30, 1915.*

## ASSETS.

Cash:		
Cash with special fiscal agent for deposit.....	\$17. 30	
Cash with other employees for transfer to special fiscal agent.....	13. 10	
Total.....		\$30. 40
Accounts receivable:		
Construction charges due and uncollected from water-right applicants.....	1, 946. 85	
Construction charges unaccrued on contracts with water-right applicants.....	244, 566. 70	
Operation and maintenance charges due and uncol- lected from water-right applicants.....	413. 44	
Uncollected rentals of buildings.....	52. 52	
Uncollected rentals of grazing and farming lands...	388. 00	
Uncollected rentals of irrigation water.....	28. 16	
Uncollected contractors' freight refunds.....	7, 458. 72	
Uncollected miscellaneous items.....	117. 50	
Total.....		254, 971. 89
Inventories:		
Mercantile stores stock on hand.....	559. 63	
Government animals.....	8, 892. 09	
Mechanical and other equipment.....	27, 464. 48	
Materials and supplies on hand in storehouses— Storehouse stock.....	60, 658. 63	
Unadjusted transfers between projects.....	385. 00	
Undistributed cost (freight and handling).....	964. 65	
Total.....		98, 924. 48
Construction work contracted:		
Unearned value of construction work contracted....	234, 097. 31	
Total.....		234, 097. 31
Construction work in process:		
Gross construction cost.....	2, 450, 038. 13	
Less construction revenue earnings—		
Rentals of buildings.....	\$3, 666. 57	
Rentals of grazing and farming lands.....	6, 502. 01	
Rentals of telephones and tolls.....	281. 15	
Contractors' freight refunds.....	13, 786. 62	
Sale of town-site lots.....	9, 354. 22	
Miscellaneous revenues.....	19, 512. 86	
Profit on mess house.....	6, 229. 10	
Profit on mercantile store.....	2, 784. 17	
Profit on hospital.....	171. 26	
Total deductions.....	62, 287. 96	
Net expenditures for construction of project to date.....	2, 387, 750. 17	
Deferred operation and maintenance charges.....	38, 650. 26	
Total assets.....		3, 014, 424. 51

## LIABILITIES, RESERVES, AND CAPITAL.

## Accounts payable:

Unpaid progress earnings under construction contracts.....	\$74,661.39
Unpaid contract holdbacks.....	89,203.17
Unpaid labor.....	5,560.18
Unpaid purchases.....	4,345.28
Unpaid freight and express.....	8,777.85
Unpaid passenger fares.....	100.40
Unredeemed coupon books.....	9.87
Unpaid miscellaneous items.....	5,120.11

Total..... \$187,778.25

## Contingent obligations:

Unearned value of construction work contracted..... 234,097.31

## Reserves for repayment to reclamation fund of cost of project:

Value of construction contracts with water-right applicants.....	308,099.73
Value of construction contracts with water-right applicants temporarily suspended.....	31,566.18
Construction water-right charges paid in advance by water-right applicants.....	1,280.04
Construction water-right charges paid and forfeited by water-right applicants.....	3,197.88
Penalties on construction charges paid by water-right applicants.....	23.78

Total..... 344,167.61

## Net investment:

Disbursements.....	\$2,372,215.24
Transfers received from other projects.....	135,467.17

2,507,682.41

## Less—

Collections.....	191,832.88
Collections, repayment refunds....	881.82
Transfers issued to other projects.....	66,586.37

259,301.07

Total..... 2,248,381.34

## Total liabilities, reserves and capital investment of the

Government..... 3,014,424.51

*Functional feature costs of Sun River project to June 30, 1915.*

Examination and surveys.....	\$112,888.19
Storage system.....	304,842.49
Canal system.....	1,673,168.76
Lateral system.....	265,297.75
Farm units.....	4,548.11
Permanent structures and land.....	66,037.47
Telephone system.....	20,745.23
Stores and other operations.....	2,510.13

Gross expenditures for construction of project to date..... 2,450,038.13

*Operating revenues and expenses, Sun River project, to June 30, 1915.*

## EXPENSES.

## Storage system:

Operation.....	\$697.47
Maintenance.....	433.57

## Canal system:

Operation.....	4,751.14
Maintenance.....	16,664.07

Lateral system:	
Operation.....	\$11,537.01
Maintenance.....	35,412.73
Undistributed expenses:	
Operation.....	3,036.46
Maintenance.....	3,767.00
Total.....	<u>76,299.45</u>

## REVENUES.

Operation and maintenance charges accrued on contracts with water-right applicants.....	35,264.66
Operation and maintenance charges paid in advance by water-right applicants.....	1,236.63
Operation and maintenance charges paid and forfeited by water-right applicants.....	635.66
Rentals of irrigating water.....	445.01
Miscellaneous revenues.....	67.23
Deferred operation and maintenance revenues (carried to debit side of assets and liability statement).....	38,650.26
Total.....	<u>76,299.45</u>

*Estimated cost of work contemplated on Sun River project during fiscal year 1916.*

Examination and surveys.....	\$2,680.00
Storage system:	
Sun River storage.....	\$13,396.00
Pishkun Reservoir.....	300.00
Willow Creek Reservoir.....	2,781.00
Benton Lake reservoir.....	200.00
	<u>16,677.00</u>
Canal system:	
Pishkun Reservoir Supply Canal.....	244,597.40
Sun River Slope Canal—	
Spring Valley division.....	165,314.00
Greenfields division.....	10,195.00
	<u>420,106.40</u>
Lateral system:	
Greenfields distribution system, first unit.....	233,535.60
Power system.....	2,680.00
Farm units.....	5,370.00
Permanent improvements and lands.....	9,870.00
Telephone system.....	2,420.00
Operation and maintenance under public notice.....	12,890.00
Stores and other operations (reimbursable).....	13,771.00
Total.....	<u>720,000.00</u>



## **MONTANA-NORTH DAKOTA, LOWER YELLOWSTONE PROJECT.**

(L. H. MITCHELL, project manager, Savage, Mont.)

### **LOCATION.**

Counties: Richland and Dawson, Mont.; McKenzie, N. Dak.

Townships: 18 to 26 N., Rs. 56 to 60 E., Montana meridian; 150 to 152 N., R. 104 W., fifth principal meridian.

Railroads: Northern Pacific, Great Northern, and Missouri River.

Railroad stations and estimated population January 1, 1915: Intake, 75; Burns, 25; Savage, 260; Craneville, 40; Sidney, 800; and Fairview, Mont., 600; Dore, N. Dak., 25.

### **WATER SUPPLY.**

Source of water supply: Yellowstone River.

Area of drainage basin: 66,000 square miles.

Annual run-off in acre-feet: Yellowstone River at Glendive, Mont., 1914, 9,435,000; maximum since 1909, 13,200,000.

### **AGRICULTURAL AND CLIMATIC CONDITIONS.**

Area for which the Service is prepared to deliver water, season of 1915: 36,250 acres.

Area under rental contracts, season of 1915: 27,075 acres.

Area under water-right applications, season of 1915: 3,124 acres.

Length of irrigating season: May 1 to October 10—163 days.

Average elevation of irrigable area: 1,900 feet.

Average annual rainfall on irrigable area; 9 years, 15.7 inches; 1914, 13.87 inches.

Range of temperature on irrigable area:  $-46^{\circ}$  to  $110^{\circ}$  F.

Character of soil of irrigable area: Deep sandy loam predominates; some alkali and gumbo.

Principal products: Grain, forage crops, and vegetables.

Principal markets: Minneapolis, St. Paul, and Duluth, Minn.; local markets consume forage crops and vegetables.

### **LANDS OPENED FOR IRRIGATION.**

Dates of public notices and orders: December 21, 1908; April 24, 1909; March 7, March 24, May 1, August 28, and November 8, 1911; March 1 and April 30, 1912; February 26, May 28, June 23, and July 21, 1913; January 19, March 4 and September 24, 1914; February 5, March 2, March 17, and March 20, 1915.

Location of lands opened: Ts. 18 and 19 N., R. 57 E.; Ts. 19 and 20 N., R. 58 E.; Ts. 21, 22, 23, 24, and 25 N., R. 59 E.; and T. 24 N., R. 60 E., Montana principal meridian; Ts. 150 and 151 N., Rs. 104 W., fifth principal meridian.

Present status of irrigable area opened: 9,536 acres entered subject to the reclamation act; 445 acres open to entry; 1,514 acres State land; 33,273 acres private land.

Limit of area of farm unit: Public, 80 acres; private, 160 acres.

Duty of water:  $2\frac{1}{2}$  acre-feet per acre per annum at the farm.

Building charge per acre of irrigable land: \$42.50 and \$45. Rental charge for 1915, 50 cents for  $1\frac{1}{2}$  acre-feet per acre; additional water at the rate of 50 cents per acre-foot.

Annual operation and maintenance charge: 75 cents per acre for 1 acre-foot; additional water at the rate of 50 cents per acre-foot.

### **CHRONOLOGICAL SUMMARY.**

Reconnaissance made and preliminary surveys begun in 1903.

Construction recommended by board of engineers, April 23, 1904.

Construction authorized by Secretary, May 10, 1904.

Lower Yellowstone Dam completed February 19, 1910.

First irrigation by Reclamation Service, season of 1909.

Entire project 96 per cent completed June 30, 1915.

**IRRIGATION PLAN.**

The irrigation plan of the Lower Yellowstone project provides for the diversion of water from the Yellowstone River at a point 18 miles below Glendive, Mont., into a canal on the west side of the river, which extends down the valley to the confluence of the Yellowstone and Missouri Rivers, conveying water for the irrigation of land lying between the canal and the Yellowstone River. The fall of the water which will be discharged from the main canal into lateral KK at a point 19 miles below the headgates will be utilized to operate turbines direct-connected to centrifugal pumps for raising water to irrigate approximately 3,000 acres of excellent bench land.

The completed features are the Lower Yellowstone Dam and diversion works; the main canal for a distance of 66.4 miles and the complete lateral system in connection therewith. Sublaterals and extensions of a few main laterals will be constructed as the needs of water users require.

The features for future construction are the pumping plant, the remaining 5 miles of the main canal, and about 52 miles of laterals which, when completed, will irrigate approximately 15,500 acres.

**CONSTRUCTION DURING THE FISCAL YEAR.**

The tile trench on drainage line No. 1 was excavated for a distance of 2½ miles, from June 30 to December 12, 1914. During the last half of the fiscal year no progress was made on this work, as supplemental construction has been discontinued. Additional structures erected on lateral extensions consisted of two steel flumes, with a total length of 580 feet, and seven wooden bridges. Two wooden bridges were constructed over drain line No. 1.

**OPERATION AND MAINTENANCE.**

During the season of 1914, from May 12 to October 10, 5,743 acres were irrigated, 4,733 being in Montana and 1,010 in North Dakota, and comprising 184 farms, of which 150 were in Montana and 34 in North Dakota.

It had been the consensus of opinion that the small amount of irrigation on the Lower Yellowstone project until the season of 1914 was due to the inability of many water users to make the required payments.

On March 4, 1914, the project was placed on a rental basis with the hope that all settlers and landowners would endeavor to make the project a success. Only 5,743 acres were irrigated during the season of 1914, and, like former years, the rains during the growing season, while sufficient to give the crops a good start, but not ample to make all grain crops fill, gave the landowners a good excuse not to irrigate. The increase in alfalfa acreage was encouraging, there being approximately 2,000 acres in this crop in 1913, while 4,000 acres were in alfalfa at the close of the season of 1914.

*Historical review, Lower Yellowstone project.*

Item.	1910	1911	1912	1913	1914	<sup>1</sup> 1915
Acreage for which service was prepared to supply water.	40, 133	37, 867	37, 880	37, 799	36, 250	36, 250
Acreage irrigated.....	8, 656	15, 445	5, 068	7, 060	5, 743	5, 765
Miles of canal operated.....	118	158	125.5	133	151	142
Water diverted (acre-feet).....	51, 142	52, 542	15, 404	30, 088	25, 709	19, 011
Water delivered to land (acre-feet).....	12, 485	21, 799	6, 058	10, 250	9, 143	6, 878
Per acre of land irrigated (acre-feet).....	1. 44	1. 41	1. 19	1. 34	1. 59	1. 19

<sup>1</sup> To June 30.

**SETTLEMENT.**

During the fiscal year and after the passage of the reclamation extension act, 7 homestead entries, comprising 450 acres, were made. At the close of the fiscal year the vacant unentered farm units on the Lower Yellowstone project can not be considered as desirable homesteads, as each farm unit is either very rough or practically covered with timber and brush. Two relinquishments were made and the same two units entered. One assignment was made and six transfers of land in private ownership.

During the year there have been installed at Sidney, Mont., an up-to-date electric-light plant and a hospital. The Great Northern Railway Co. completed its road from Sidney to Lambert. While this new branch of the railroad does not materially benefit the settlers on the project, it is considered of great value in developing the farming country adjacent to the project.

*Settlement data, Lower Yellowstone project.*

Item.	1913	<sup>1</sup> 1914	<sup>2</sup> 1915
Total number of irrigable farms on project.....	456	512	514
Population of above.....	600	700	816
Number of irrigated farms.....	158	184	190
Irrigable farms operated by owners.....	191	140	160
Irrigable farms operated by tenants.....	21	153	173
Irrigable farms with neither owners nor tenants on same.....	136	171	181
Number of towns.....	7	8	8
Population of above.....	1,125	1,750	1,835
Total population in towns and on farms.....	1,725	2,450	2,651
Number of public schools.....	15	16	16
Number of churches.....	4	4	5
Number of banks.....	7	9	9
Total capital stock.....	\$200,000	\$260,000	\$277,000
Total number of deposits.....		\$715,000	\$908,000
Total number of depositors.....		3,600	3,838
Number of relinquishments.....	2	2	2

<sup>1</sup> Project on rental basis.<sup>2</sup> To June 30. Project on rental basis.**PRINCIPAL CROPS.**

While the principal crops raised on the Lower Yellowstone project consist of grains, it is encouraging to note that the irrigated acreage in alfalfa is approximately three times greater than any other irrigated crop. At the close of the irrigation season of 1914 there were 4,184 acres in alfalfa. Although this acreage is small, it has doubled during the last year.

The average yield of both irrigated and nonirrigated crops is \$3 per acre greater than for the year 1913. This increase in returns per acre can be attributed to the excessive rains in June, 1914, and to better farming on the part of the settlers.

# MONTANA-NORTH DAKOTA, LOWER YELLOWSTONE PROJECT. 165

*Crop report of irrigated lands on Lower Yellowstone project, Montana-North Dakota, year of 1914.*

Irrigated crop.	Area (acres).	Unit of yield.	Yields.		Values.		
			Total.	Average per acre.	Per unit of yield.	Total.	Per acre.
Alfalfa.....	2,571	Tons.....	6,310	2.5	\$7.20	\$45,431	\$17.67
Alfalfa, first-year.....	313	do.....	172	.5	6.81	1,172	3.74
Barley.....	407	Bushels.....	8,072	19.8	.43	3,451	8.48
Corn.....	107	do.....	3,512	32.8	.72	2,519	23.54
Flax.....	157	do.....	1,964	12.4	1.24	2,421	15.42
Garden.....	81	.....	.....	.....	.....	6,371	78.65
Hay, native.....	90	Tons.....	90	1.0	9.18	826	9.18
Oats.....	575	Bushels.....	17,628	30.7	.34	6,062	10.54
Pasture.....	108	.....	.....	.....	.....	478	4.43
Potatoes.....	54	Bushels.....	7,580	140.4	.65	4,923	91.17
Wheat.....	1,071	do.....	20,998	19.6	1.00	21,025	19.63
Miscellaneous.....	87	.....	.....	.....	.....	2,028	23.31
Total acreage cropped under irrigation.....	5,621	Total and average.....				96,707	17.20
Irrigated, not cropped.....	122						
Grand total irrigated...	5,743						

Areas.	Acres.	Farms.	Per cent of project. <sup>1</sup>
Total irrigable area farms reported.....	16,461	184	46
Total irrigated area farms reported.....	5,743	184	16
Under water-right applications.....	13	1	.....
Under rental contracts.....	5,730	183	16
Total cropped area farms reported.....	113,325	184	37

<sup>1</sup> Based on area for which water was available.      <sup>2</sup> Includes 7,704 acres cropped by dry farming.

*Crop report of lands dry farmed on Lower Yellowstone project, Montana-North Dakota, year of 1914.*

Crops.	Area (acres).	Unit of yield.	Yields.		Values.		
			Total.	Average per acre.	Per unit of yield.	Total.	Per acre.
Alfalfa.....	834	Tons.....	1,329	1.6	\$7.00	\$9,316	\$11.17
Alfalfa, first-year.....	466	do.....	42	.1	8.00	336	.72
Barley.....	2,000	Bushels.....	36,519	18.2	.45	16,248	8.12
Corn.....	329	do.....	8,415	25.6	.72	6,095	18.51
Flax.....	2,208	do.....	14,641	6.6	1.26	18,448	8.36
Garden.....	23	.....	.....	.....	.....	2,003	87.09
Hay, native.....	1,001	Tons.....	645	.6	11.50	7,423	7.42
Oats.....	3,034	Bushels.....	89,804	29.6	.38	32,214	10.62
Potatoes.....	73	do.....	9,440	129.3	.68	6,428	88.05
Pasture.....	1,691	.....	.....	.....	.....	3,211	1.90
Wheat.....	4,841	Bushels.....	74,785	15.4	.99	73,897	15.28
Miscellaneous.....	604	.....	.....	.....	.....	6,378	10.56
Total acreage cropped by dry farming.....	17,104	Total and average.....				181,997	10.64

Areas.	Acres.	Farms.	Per cent of project.
Total irrigable area farms reported.....	27,580	1347	76
Total cropped area farms reported.....	17,104	347	47

<sup>1</sup> Includes 163 farms containing both irrigated and dry crops.

**ORDER DATED FEBRUARY 5, 1915.**

All entrymen and landowners under the Lower Yellowstone project, Montana-North Dakota, for whose land water will be available in the irrigation season of 1915, who did not file an acceptance of the provisions of the order of March 4, 1914, within the time limited in paragraph 2 thereof, may obtain a supply of water for the irrigation of their lands in the season of 1915 and thereafter until further notice, on a rental basis of 50 cents per irrigable acre for the irrigation season, payment thereof to become due December 1 after the close of the irrigation season, in case they shall on or before April 1, 1915, file with the project manager at Savage, Mont., a written acceptance of the terms and conditions of this order and the order of March 4, 1914, and comply with the cultivation requirements thereof; provided that payment be made at the time of acceptance at the rate of 50 cents per irrigable acre for the season of 1914 plus interest at the rate of 10 per cent per annum from December 1, 1914, to the date of such acceptance and payment.

FRANKLIN K. LANE,  
*Secretary of the Interior.*

**ORDER DATED MARCH 2, 1915.**

In order to provide for the relief of those settlers who have made homestead entries for lands under the Lower Yellowstone project, Montana-North Dakota, withdrawn under the provisions of section 3 of the reclamation act of June 17, 1902 (32 Stat., 388), situated in T. 26 N, R. 59 E., M. P. M., and project lands in North Dakota, it is hereby ordered:

(1) For all such lands covered by existing uncompleted homestead entries the withdrawal under the reclamation act will be revoked as to lands held to be susceptible of irrigation to the end that patent may issue upon proper compliance with the general homestead laws: *Provided*, That the reclamation withdrawal will not be revoked as to any such land until the entryman has made proof of residence, improvement, and cultivation under the act of June 23, 1910 (36 Stat., 592), and thereafter has become a member of the water users' association and has executed stock subscription and contract with the association covering the land which has been recorded: *And provided further*, That when water is made available for the irrigation of the land the area for which any one entryman or his successor in interest may hold a water right under the project prior to full payment will be limited to 80 acres of irrigable land.

A. A. JONES,  
*First Assistant Secretary.*

**PUBLIC NOTICE DATED MARCH 17, 1915.**

1. Under the terms of existing public notices and orders the operation and maintenance charges for the Lower Yellowstone project, Montana, become due on December 1 of each year in advance.

2. In pursuance of the provisions of the reclamation act of June 17, 1902 (32 Stat., 388), and acts amendatory thereof and supplemental thereto, and in particular the reclamation extension act of August 13, 1914 (38 Stat., 686), section 6 of which authorizes the

Secretary of the Interior to fix the due date for operation and maintenance charges, notice is hereby given that the operation and maintenance charge for the said project, which, under existing public notices, became due December 1, 1914, is postponed to and shall become due on March 1, 1916, and all operation and maintenance charges hereafter made against lands under the said project shall become due on March 1 of each year thereafter until further notice.

3. Hereafter no operation and maintenance charge shall be collected at the time water-right application is filed, but the first payment on account of operation and maintenance shall become due on March 1 of the year following the calendar year in which entry or water-right application was made: *Provided, however,* That if original homestead entry or original water-right application be filed after June 15 in any year the first payment on account of operation and maintenance will not become due until March 1 of the second calendar year following the date of entry.

4. The discount for payment made on or before the due date and the penalties for failure to make payment before the first day of the third calendar month after the due date will be applied as provided in section 6 of the said reclamation extension act.

5. The operation and maintenance charges for the irrigation season of 1915 shall be due March 1, 1916, and each acre of irrigable land, whether irrigated or not, shall be charged with a minimum operation and maintenance charge of 75 cents, which will permit delivery of not more than 1 acre-foot per acre. Should further quantities be needed, they will be furnished at the rate of 50 cents per acre-foot.

6. The provisions of this public notice shall apply to all lands subject to public notice heretofore issued for the said project except lands receiving water on a rental basis.

7. Except as hereinabove provided, all the terms and provisions of existing public notices and orders for the Lower Yellowstone project shall remain unchanged.

A. A. JONES,  
*First Assistant Secretary.*

#### FINANCIAL STATEMENTS.

*Assets, liabilities, reserves, and capital, Lower Yellowstone project, to June 30, 1915.*

##### ASSETS.

Accounts receivable:	
Construction charges due and uncollected from water-right applicants.....	\$44,005.82
Construction charges unaccrued on contracts with water-right applicants.....	1,090,111.46
Total.....	\$1,134,117.28
Inventories:	
Material and supplies on hand in storehouse.....	14,674.91
Unadjusted transfers between projects.....	30.00
Undistributed cost (freight and handling on inventory property).....	420.99
Total.....	15,125.90
Operation and maintenance charges due and uncollected from water-right applicants.....	126,025.44
Uncollected miscellaneous items.....	256.00
Total.....	126,281.44

## Construction work in process:

Gross expenditures for construction of project to date.....	\$2, 829, 439. 18
Gross expenditures for supplemental construction of project to date.....	63, 187. 90
	<u>\$2, 892, 627. 17</u>

## Less revenue earned during construction, as follows:

Rentals of buildings.....	5, 070. 49
Rentals of irrigation water.....	10, 676. 71
Rentals of telephones and tolls...	4, 831. 01
Contractors' freight refunds.....	21, 261. 33
Loss on mess houses.....	<sup>1</sup> 6, 532. 83
Profit on mercantile store.....	640. 33
Profit on hospital.....	190. 49

Total deductions..... 36, 137. 53

Net expenditures for construction of project to date.....\$2, 856, 489. 64

Deferred operation and maintenance charges..... 269, 396. 09

Total assets..... 4, 401, 410. 35

## LIABILITIES, RESERVES, AND CAPITAL.

## Accounts payable:

Unpaid contract holdbacks.....	\$13, 832. 11
Unpaid labor.....	887. 66
Unpaid purchases.....	189. 00
Unpaid freight and express.....	1, 077. 06
Unpaid passenger fares.....	156. 43
Unpaid agreements to purchase real estate.....	694. 00
Unpaid miscellaneous.....	11, 927. 68

Total..... \$28, 763. 94

## Reserves for repayment to reclamation fund of cost of project:

Value of construction contracts with water-right applicants.....	984, 366. 90
Value of construction contracts with water-right applicants temporarily suspended.....	158, 493. 50
Construction charges paid in advance by water-right applicants.....	25, 949. 95
Construction charges paid and forfeited by water-right applicants.....	255. 00

Total..... 1, 169, 065. 35

## Net investment:

Disbursements.....	\$3, 269, 410. 42
Transfers received from other projects.....	100, 488. 45
	<u>3, 369, 898. 87</u>

## Less—

Collections.....	125, 471. 06
Transfers issued to other projects.....	40, 846. 75
	<u>166, 317. 81</u>

Total..... 3, 203, 581. 06

Total liabilities, reserves, and capital investment of the Government..... 4, 401, 410. 35

<sup>1</sup> Deduct.

*Functional feature costs of Lower Yellowstone project to June 30, 1915.*

Examination and surveys.....	\$50,452.74
Storage system.....	338,402.29
Canal system.....	2,006,993.06
Lateral system.....	269,004.96
Drainage system.....	62,437.99
Farm units.....	16,570.04
Permanent improvements and land.....	124,242.17
Telephone system.....	23,717.32
Operation and maintenance charges transferred to and compounded with construction charges.....	806.60

Gross expenditures for construction of project to date..... 2,892,627.17

*Operating revenues and expenses, Lower Yellowstone project, to June 30, 1915.***EXPENSES.**

Storage system.....	\$93,061.21
Canal system:	
Operation.....	24,798.35
Maintenance.....	123,588.31
Lateral system:	
Operation.....	15,364.61
Maintenance.....	95,971.66
Undistributed expenses:	
Operation.....	9,061.01
Maintenance.....	71,017.01
Accrued and unpaid operation and maintenance charges added to con- struction.....	<sup>1</sup> 806.60
Total.....	<u>432,055.56</u>

**REVENUES.**

Operation and maintenance charges accrued on contracts with water-right applicants.....	161,657.88
Operation and maintenance charges paid in advance by water-right appli- cants.....	387.00
Operation and maintenance charges paid and forfeited by water-right applicants.....	125.25
Penalties on operation and maintenance charges.....	.04
Rentals of grazing and farming lands.....	465.00
Rentals of irrigation water.....	24.50
Deferred operation and maintenance revenues (carried to debit side of assets and liabilities statement).....	269,396.09
Total.....	<u>432,055.56</u>

*Estimated cost of contemplated work, Lower Yellowstone project, during fiscal year 1916.*

Permanent improvements and lands.....	\$125.00
Operation and maintenance.....	33,814.00
Reimbursable accounts.....	150.00
Unallotted to features.....	12,911.00
Total.....	<u>47,000.00</u>

<sup>1</sup> Deduct



## NEBRASKA, PLATTE RIVER RECONNOISSANCE.

Claim has been made by the people living along the Platte River in Nebraska that sufficient water was available in that stream during the winter and spring months for the irrigation by direct diversion into canals of a considerable area of land in Gosper, Phelps, and Kearney Counties, Nebr. The Secretary accordingly approved orders for a preliminary survey and investigation to determine the feasibility and approximate cost of the necessary irrigation works, and on February 28, 1914, the comptroller approved an expenditure of \$10,000, or such part thereof as may be necessary, for a preliminary investigation. Mr. Charles T. Pease, engineer, was assigned to this work, and was in the field with a survey party during June, July, and August, 1914, making a reconnoissance to ascertain the probable amount of water available, the area of land to which it could be applied, and the approximate cost of construction of a flood-water canal for this purpose. A report was submitted on October 16, 1914, signed by R. F. Walter, supervising engineer, United States Reclamation Service; C. T. Pease, engineer, United States Reclamation Service; G. E. Condra, director, Nebraska Water Supply Survey, who concurred in the conclusions of the report as affecting the tri-county project; and Donald D. Price, State engineer of Nebraska. The conclusions of this report are as follows:

1. That there is during ordinary years flood water in the Platte River between March 1 and June 30, in excess of the present consumption, amounting to approximately 340,000 acre-feet, and that there is as a rule no flood water in the river above present consumption after July 1.

2. That the outstanding appropriations amount to more than the river discharge, but that only 1,000 second-feet of water are now being used below North Platte.

3. That in order to secure a reliable water supply it will be necessary for the State of Nebraska to cancel all appropriations from the Platte River east of North Platte in excess of the 1,000 second-feet now used.

4. That no steps should be taken toward the construction of this project until all excess appropriations have been canceled.

5. That after all excess appropriations have been canceled about 140,000 acre-feet of water can, under the plans submitted, be delivered to the land embraced in this project, between March 1 and June 30, and none after July 1.

6. That the cost of constructing this project as outlined in the report will be between \$30 and \$35 per acre for 140,000 acres of irrigable land.

7. That there are no public lands in this project, all being in private ownership.

### FINANCIAL STATEMENTS.

The assets and liabilities are shown in the financial statement for the secondary projects. The costs are given in the functional feature cost report which follows the above statement, and the net investment is given in Tables 11 and 12 in the appendix.

## NEBRASKA-WYOMING, NORTH PLATTE PROJECT.

ANDREW WEISS, project manager, Mitchell, Nebr.

### LOCATION AND CLIMATIC CONDITIONS.

Counties: Sioux, Scotts Bluff, Banner, and Morrill, Nebr.; Natrona, Carbon, Converse, Goshen, and Platte, Wyo.

Townships: 19 to 27 N., Rs. 48 to 67 W.; 26 to 30 N., Rs. 83 to 85 W., sixth principal meridian.

Railroads: Chicago, Burlington & Quincy; Union Pacific; Chicago & North Western; Colorado & Southern.

Railroad stations and estimated population, January 1, 1915: Bridgeport, 700; Bayard, 400; Minatare, 600; Scottsbluff, 2,500; Mitchell, 900; Morrill, 600; and Henry, Nebr., 100; Torrington, 500; Vaughn; Lingle, 100; Barnes; Fort Laramie; Whalen; Guernsey, 400; and Casper, Wyo., 5,000.

### WATER SUPPLY.

Source of water supply: North Platte River.

Area of drainage basin: 12,000 square miles.

Annual run-off in acre-feet of North Platte River: At Pathfinder, Wyo. (12,000 square miles), 1905 to 1914—Maximum, 2,420,000; minimum, 870,000; mean, 1,439,000. At Guernsey or Whalen, Wyo. (16,200 square miles), 1900 to 1914—Maximum, 2,690,000; minimum, 983,000; mean, 1,604,000.

### AGRICULTURAL AND CLIMATIC CONDITIONS.

#### INTERSTATE UNIT.

Area for which the service is prepared to supply water, season of 1915, 129,684 acres.

Area under water-right applications and rental contracts, season of 1915, 101,376 acres.

Length of irrigating season: From April 1 to September 30—183 days.

Average elevation of irrigable area: 4,100 feet above sea level.

Average annual rainfall on irrigable area: 5 years, 13.64 inches; 1914, 10.12 inches; comparatively dry.

Range of temperature on irrigable area:  $-25^{\circ}$  to  $104^{\circ}$  F.

Character of soil of irrigable area: Sandy loam.

Principal products: Alfalfa, cereals, corn, sugar beets, potatoes.

Principal markets: Omaha, Nebr.; Kansas City and St. Joseph, Mo.; Denver, Colo.; central Wyoming.

### LANDS OPENED FOR IRRIGATION.

Dates of public notices and orders: July 29, 1907; May 29, June 16, November 12, 1908; March 3, March 27, June 2, 1909; March 12, April 4, June 6, June 25, July 2, September 10, 1910; March 7, March 24, April 21, December 30, 1911; March 13, March 14, March 19, May 23, June 24, September 5, 1912; February 5, March 11 (2), March 29, June 16, June 23, July 13, September 4, 1913; September 24, 1914; February 27, 1915; April 23, 1915.

Location of lands opened: Ts. 22 to 26 N., Rs. 52 to 65 W., sixth principal meridian.

Present status of irrigable lands opened: 64,508 acres entered subject to the reclamation act; 3,275 acres open to entry; 371 acres withdrawn from entry; 4,210 acres of State lands; 21,272 acres in private ownership; 17,837 acres of lands under the North Platte Canal & Colonization Co. tract in Wyoming.

Limit of area of farm units: Public, 80 acres; private, 160 acres.

Duty of water: Two and one-half acre-feet per acre per annum at the farm.

Charges per acre of irrigable land: Building, \$45 and \$55; annual operation and maintenance, 80 cents per acre, covering the use of not exceeding 1 acre-foot per acre and 30 cents for each additional acre-foot.

**CHRONOLOGICAL SUMMARY.**

Reconnaissance made and preliminary surveys begun in 1902.  
 Construction recommended by director March 7, 1903.  
 Construction conditionally authorized by Secretary March 14, 1903.  
 First irrigation by Reclamation Service, season of 1908.  
 Whalen Diversion Dam completed February, 1909.  
 Pathfinder Dam completed June, 1909.  
 Pathfinder Dike completed May, 1911.  
 Interstate Canal, 165 miles completed June 30, 1914.  
 Entire project, comprising storage and interstate units, 98 per cent completed June 30, 1915.

**IRRIGATION PLAN.**

The irrigation plan of the North Platte project provides for the storage of flood waters of North Platte River in a reservoir controlled by the Pathfinder Dam, about 3 miles below the junction of the North Platte and Sweetwater Rivers and 50 miles southwest of Casper, Wyo., and in smaller reservoirs along the canal lines; and the diversion of water from North Platte River by a dam near Whalen, Wyo., into the Interstate Canal, supplying water for lands on the north side of the river and into the Fort Laramie Canal, watering lands on the south side of the river. The United States claims all waste, seepage, spring, and percolating water arising within the project and proposes to use such water in connection therewith.

The completed features are: Pathfinder Dam and Dike; Whalen Diversion Dam; the first three divisions of the Interstate Canal; lateral systems of districts 1, 2, and 3 of the Interstate Canal system; Reservoir No. 1, known as Lake Alice; Reservoir No. 3, known as Lake Minatare. The Fort Laramie Canal system, covering approximately 107,000 acres, remains for future construction.

**CONSTRUCTION DURING FISCAL YEAR.**

*Pathfinder Reservoir.*—The 5-foot cast-iron discharge tubing in the south tunnel was lined with steel pipe. A conduit for the delivery of air to the jets issuing from the balanced valves was extended. The length of the discharge tubing was lessened by 25 feet. Part of the south tunnel was lined with concrete on one side.

*Interstate Canal.*—Work on the Low Line Canal and lateral system has been completed. The excavation was nearly all done by contract and the structures were built by Government forces. About 8 miles of laterals have been built in the first and second lateral districts to water land not formerly included on farm-unit plats.

*Supplementary storage.*—In the development of the third lateral district it is necessary to provide supplementary storage reservoirs. There are four available reservoir sites, Nos. 1, 2, and 3, and Winter Creek Lake, with capacities of 11,400, 27,000, 67,000, and 3,000 acre-feet, respectively. Reservoir No. 1 is known as Lake Alice and Reservoir No. 3 as Lake Minatare. Dam No. 3 was completed on June 21, 1915. The construction of this dam involved the handling of about 864,322 cubic yards of earth and gravel fill, 15,176 cubic yards of unscreened gravel, 27,209 cubic yards of brule clay excavation, and 17,286 cubic yards of concrete.

**DRAINAGE.**

The necessary surveys and investigations incident to the planning and construction of drainage works were continued during the year. These investigations include borings over the affected areas and tracts likely to become seeped, to determine the subsoil conditions, the elevation, and periodic variation of the water table, and other factors bearing upon the location and construction of the drainage works.

During the year a branch of the Hiersche drain was completed, consisting of 150 linear feet of open ditch, 250 linear feet of 12-inch tile, and 530 linear feet of 10-inch tile. A branch of the Sunflower drain, 4,000 feet long, was built, 12-inch tile being used the entire length. The drain was built in soft quicksand, which made the work unusually expensive. The territory through which this drain was built is underlain by gravel at a depth of from 1 to 6 feet below the grade of the tile, and 6-inch wells were put down from the tile to gravel every 50 feet. These wells have been very effective in draining off water from the gravel, which appears in this case to be the water-bearing stratum. A small amount of open ditch was excavated to release the water impounded in the Sheep Creek sinks. A considerable amount of repair work was done on the McAllister drain.

The Stewart drain, an open ditch 6,000 feet long, was completed by the drag-line excavator, the total material excavated being 39,370 cubic yards. This drain discharges the water from a lake immediately above the Tri-State Canal and an adjoining swamp into Dry Spotted Tail Creek. For the handling of the seepage water from Dam No. 3 and certain seeped areas below this reservoir, the Alliance drain was excavated from Dam No. 3 to Nine Mile Creek, the nearest watercourse, a distance of about 6 miles. Part of this work was done by means of the trench machine, part by means of a ditching plow by contract, and a smaller portion with teams and scrapers. The total amount of material excavated was about 28,000 cubic yards.

In an attempt to get a larger flow of water, holes were bored in places under the Dunham drain to a depth of several feet into brule clay. In several places these holes have been very effective, drawing considerable amounts of water from the underlying water-bearing stratum into the tile line. This work and other investigations made during the year render it increasingly evident that the only way to drain the greater part of seeped land successfully on this project is to tap the water bearing substrata either directly by the drains themselves or indirectly by wells put down from the drains.

Although an unusually large amount of water was used in irrigation in 1914, yet wherever drains had been constructed and were in working order the seepage was greatly lessened and in most cases excellent crops were produced on land previously swamped.

#### OPERATION AND MAINTENANCE.

The system as operated during the present season consisted of the Pathfinder Reservoir, the Whalen Diversion Dam, 95 miles of main canal, Lake Alice, 5 miles of Reservoir Supply Canal, Lake Minatare, 37 miles of High Line Canal, 42 miles of Low Line Canal, and 627 miles of laterals. In 1914 water to the amount of 176,915 acre-feet was delivered to 944 farms, containing approximately 60,532 acres in crop, exclusive of the lands of the North Platte Canal & Colonization Co., to which 41,547 acre-feet of water were delivered for the irrigation of 85 farms, containing approximately 7,168 acres in crop. The average amount of water used upon the land under the interstate unit was 2.92 acre-feet per acre, and upon the land of the North Platte Canal & Colonization Co. 5.80 acre-feet per acre. The total diversion at the Whalen Dam during the irrigation season of 1914 was 415,980 acre-feet. During the first part of the season of 1915,

81,116 acres of land were entitled to water under water-right applications, 2,423 acres under rental contracts, and 17,837 acres under contract with the North Platte Canal & Colonization Co. Of this amount approximately 73,881 acres were under cultivation under the different arrangements. Water was diverted into the main canal on April 22, 1915, the maximum diversion to June 30 being 1,395 second-feet. The prevalence of local showers has rendered the use of water light for the first part of the season of 1915, and water has been delivered on demand. The storage in Pathfinder Reservoir was 1,079,720 acre-feet on July 1, 1914, decreasing to 307,870 acre-feet on November 4, 1914, increasing to 671,290 acre-feet on June 27, 1915, and again decreasing to 668,580 acre-feet on June 30, 1915.

*Historical review, North Platte project.*

Item.	1910	1911	1912	1913	1914	1915
Acres for which service was prepared to supply water.....	<sup>1</sup> 87,994	<sup>1</sup> 96,898	<sup>1</sup> 103,837	<sup>1</sup> 109,272	<sup>1</sup> 109,341	<sup>1</sup> 129,684
Acres irrigated.....	<sup>1</sup> 48,537	<sup>1</sup> 49,411	<sup>1</sup> 55,631	<sup>1</sup> 63,366	<sup>1</sup> 67,700	<sup>1</sup> 73,881
Miles of canal operated.....	487	534	602	648	652	806
Water delivered to land (acre-feet).....	<sup>2</sup> 166,238	<sup>2</sup> 190,427	<sup>2</sup> 113,251	<sup>2</sup> 141,489	<sup>2</sup> 176,915	.....
Per acre of land irrigated (acre-feet).....	<sup>2</sup> 3.93	<sup>2</sup> 4.26	<sup>2</sup> 2.25	<sup>2</sup> 2.49	<sup>2</sup> 2.92	.....

<sup>1</sup> Includes North Platte Canal & Colonization Co. lands.

<sup>2</sup> Exclusive of lands under North Platte Canal & Colonization Co. tract.

**SETTLEMENT.**

Conditions on the project have been materially improved during the year, due in part to a fair crop, for which there existed an excellent market, and in part to the relief afforded by the reclamation extension act. The number of transfers of farms has been about normal. A number of entries have been made on vacant farm units. A considerable number of cattle and sheep were fed on the project at a fair profit. The Department of Agriculture has kept an expert in the valley for the purpose of combating hog cholera and aiding the settlers in the general improvement of the hog industry. The results were excellent. The following table shows settlement data for the project for the years 1912 to 1915, inclusive. The territory covered by this table is for the lands irrigated by the Reclamation Service only and extends from the eastern boundary of range 51 west, in Nebraska, to range 60 west, inclusive, in Wyoming, on the west.

*Settlement data, North Platte project.*

Item.	1912	1913	1914	1915
Total number of farms on project.....	1,270	1,270	<sup>1</sup> 1,270	<sup>1</sup> 1,456
Population of.....	2,504	2,774	<sup>1</sup> 3,800	<sup>1</sup> 3,900
Number of irrigated farms.....	777	908	944	<sup>1</sup> 1,050
Operated by owners or managers.....	575	603	567	<sup>1</sup> 600
Operated by tenants.....	202	305	377	<sup>1</sup> 450
Population of.....	( <sup>2</sup> )	( <sup>2</sup> )	3,290	<sup>1</sup> 3,600
Number of towns.....	7	7	7	7
Population of.....	4,600	4,762	<sup>1</sup> 4,900	<sup>1</sup> 5,000
Total population in towns and on farms.....	7,104	7,536	<sup>1</sup> 8,700	<sup>1</sup> 8,900
Number of public schools.....	24	30	34	34
Number of churches.....	25	25	25	25
Number of banks.....	13	13	14	15
Total capital stock.....	\$277,000	\$277,000	\$302,000	\$317,000
Total amount of deposits.....	( <sup>2</sup> )	\$1,160,000	\$1,704,000	\$1,710,000
Total number of depositors.....	.....	.....	.....	<sup>1</sup> 5,700
Number of relinquishments.....	5	10	1	.....
Number of cancellations.....	14	8	6	.....

<sup>1</sup> Estimated.

<sup>2</sup> Data not available.

## PRINCIPAL CROPS.

The acreage under crop has continued to increase, until in 1915 it is estimated to amount to 73,881 acres, including the North Platte Canal & Colonization Co.'s lands. Of this amount about 49 per cent is in alfalfa, 11 per cent in sugar beets, 31 per cent in small grain and corn, and the remaining 9 per cent in potatoes and miscellaneous crops. The total value of the crops on the interstate project for the year 1914 was \$890,202, with an average value per acre of \$14.95, as compared with a total value of \$786,621, and an average value per acre of \$13.84 in the year 1913. Unusually low temperature during the early part of the summer has retarded the growth of crops in 1915, but indications are that there will be excellent crops over the project, except the first cutting of alfalfa, which was poor.

The following tabulated crop report for 1914 is for the interstate project only:

*Crop report, North Platte (interstate) project, Nebraska-Wyoming, year of 1914.*

Irrigated crop.	Area (acres).	Unit.	Yields.		Values.		
			Total.	Average per acre.	Per unit.	Total.	Per acre.
Alfalfa hay.....	32,464	Tons.....	71,405	2.2	\$4.50	\$321,323	\$9.90
Alfalfa seed.....	922	Bushels....	863	.9	8.00	6,904	7.49
Barley.....	2,261	do.....	53,022	23.4	.60	31,813	14.07
Beets, sugar.....	5,083	Tons.....	53,282	10.5	5.50	293,051	57.65
Beets, stock.....	215	do.....	3,334	15.5	4.00	13,336	62.03
Cane, fodder.....	15	do.....	14	.9	3.00	42	2.80
Corn.....	6,024	Bushels....	93,186	15.5	.75	69,890	11.60
Garden.....	305					5,177	16.97
Hay, native and timothy..	363	Tons.....	255	1.6	8.00	2,040	5.62
Millet seed.....	43	Bushels....	63	1.5	1.00	63	1.47
Oats.....	7,017	do.....	146,211	20.8	.40	58,484	8.33
Pasture.....	2,873					22,984	8.00
Potatoes.....	1,097	Bushels....	159,027	145.0	.35	55,659	50.74
Rye.....	245	do.....	1,363	5.6	.70	954	3.89
Wheat.....	609	do.....	9,979	16.4	.85	8,482	13.93
Total cropped acreage.	59,536	Total and average.....				890,202	14.95
Irrigated, not cropped:							
Alfalfa, seeded with nurse crop.....	3,892						
Alfalfa, seeded without nurse crop.....	996						
Less duplicated areas...	3,892						
Grand total irrigated.	60,532						

Areas.	Acres.	Farms.	Per cent of project.
Total irrigable area farms reported.....	74,216	944	81
Total irrigated area farms reported.....	60,532	944	66
Under water-right applications.....	59,954	937	65
Under rental contracts.....	578	7	1
Total cropped area farms reported.....	59,536	944	65

## FORT LARAMIE CANAL.

Since the thirteenth annual report was written trust deeds have been executed to cover practically 90 per cent of the patented lands within this unit, considering the same to the divide between the Gering and Creighton Valleys. A consulting board convened in

Mitchell, Nebr., July 12, 1914, for further and probably final consideration of certain important engineering features in connection with the plans for this unit. Field work is under way on the revision of the location survey, sinking test pits for classification purposes, and office work is in progress on the plans for the important structures and tunnels of the first division of the main canal. The officers of the Fort Laramie & Gering Water Users' Association and all interested landowners and entrymen are hopeful of an early formal approval of the construction of this unit.

#### **SALE OF SUPPLEMENTAL STORAGE RIGHTS FROM PATHFINDER RESERVOIR TO PRIVATE LANDS.**

In accordance with the plans mentioned in the eleventh and further referred to in the thirteenth annual reports, a contract for the sale of supplemental storage water to the Bridgeport irrigation district was approved by the Acting Secretary of the Interior.

A detailed study has been made of the available water supply on the basis of all available run-off data and the results were reviewed by a board appointed for this purpose in December, 1914, and thereafter in January and until March, 1915. These studies have shed much light upon the question of further disposal of Pathfinder water and the limitations to further project extensions, but because of certain legal complications and the limited period of the observed run-off, as well as the present somewhat indefinite knowledge regarding the duty of water in this locality the results are not sufficiently conclusive to permit of any practical determination of this question.

The hydrographic studies mentioned in the thirteenth annual report are still being continued by a competent hydrographer, who is making river measurements to determine losses in transmission, inflow from tributaries and other sources, such as will aid in a determination of water rights and proper water distribution.

#### **PUBLIC NOTICE DATED FEBRUARY 27, 1915.**

1. Under the terms of existing public notices and orders, the operation and maintenance charges for the North Platte project, Nebraska-Wyoming, become due on December 1 of each year, in advance, except for those lands remaining subject to the \$45 rate of construction charge.

2. In pursuance of the provisions of the reclamation act of June 17, 1902 (32 Stat., 388), and acts amendatory thereof and supplemental thereto, and in particular the reclamation extension act of August 13, 1914 (38 Stat., 686), section 6 of which authorizes the Secretary of the Interior to fix the due date for operation and maintenance charges, notice is hereby given that for all except the \$45 lands under said project, the operation and maintenance charge, which under existing public notices became due December 1, 1914, is postponed to and shall become due on March 1, 1916, for the irrigation season of 1915, and all operation and maintenance charges hereafter made against these lands shall become due on March 1 of each year thereafter until further notice.

3. Hereafter no operation and maintenance charge shall be collected at the time water-right application is filed, but the first payment on

account of operation and maintenance shall become due on March 1 of the year following the calendar year in which same was made: *Provided, however,* That if original homestead entry or original water-right application be filed after June 15 in any year, the first payment on account of operation and maintenance will not become due until March 1 of the second calendar year following the date of entry.

4. Charges for operation and maintenance against lands remaining under the \$45 rate do not become due in advance, and for such lands the operation and maintenance charges which became due December 1, 1914, are hereby advanced to and shall become due on March 1, 1915. All operation and maintenance charges hereafter made against such lands shall become due on March 1 of each year thereafter until further notice. For the operation and maintenance charge due March 1, 1915, no discount will be allowed for prepayment, but penalties will attach as prescribed by the reclamation extension act. As to operation and maintenance charges due March 1, 1916, and thereafter, the discount for advance payment and penalties for failure to make payment within the prescribed time will be applied as provided by the reclamation extension act.

5. The discounts and penalties herein provided for attach for all lands whether acceptances of the provisions of the reclamation extension act are filed or not.

6. For lands not subject to the \$45 rate, the discount for payment made on or before the due date and the penalties for failure to make payment before the first day of the third calendar month after the due date will be applied as provided in section 6 of the said reclamation extension act.

7. The operation and maintenance charges for the irrigation season of 1915 shall be due March 1, 1916, and each acre of irrigable land, whether irrigated or not, shall be charged with a minimum operation and maintenance charge of 80 cents, which will permit delivery of not more than 1 acre-foot per acre. For the first acre-foot additional at the rate of 25 cents per acre-foot, and should further quantities be needed they will be furnished at the rate of 30 cents per acre-foot.

8. The provisions of this public notice cover all lands subject to public notice heretofore issued for the said project.

9. Except as hereinabove provided, all the terms and provisions of existing public notices and orders for the North Platte project shall remain unchanged.

A. A. JONES,  
*First Assistant Secretary.*

**PUBLIC NOTICE DATED APRIL 23, 1915.**

1. In pursuance of the provisions of section 4 of the reclamation act of June 17, 1902 (32 Stat., 388), and acts amendatory thereof and supplemental thereto, and particularly the reclamation extension act of August 13, 1914 (38 Stat., 686), notice is hereby given that water will be furnished under the North Platte project, Nebraska-Wyoming, in the irrigation season of 1915 and thereafter for the irrigable lands of said project shown on the farm-unit plats of sixth principal meridian: T. 22 N., R. 54 W.; T. 23 N., R. 54 W.; T. 23 N., R. 55 W.;



T. 23 N., R. 56 W.; T. 23 N., R. 58 W.; T. 24 N., R. 55 W.; T. 24 N., R. 56 W.; T. 24 N., R. 57 W.; T. 24 N., R. 58 W.; T. 24 N., R. 60 W.; T. 25 N., R. 61 W.; approved by the Secretary of the Interior on March 29, 1915, and on file in the local land offices at Alliance, Nebr., and Cheyenne, Wyo., and in the office of the project manager at Mitchell, Nebr.

2. Homestead entries of the farm units shown on said plats embracing public lands of the United States may be made on and after May 15, 1915, at 9 o'clock a. m., at the appropriate land office, if found regular and accompanied by the certificate of the project manager, showing that water-right application has been filed and the proper water-right charges deposited.

3. Warning is hereby expressly given that no person will be permitted to gain or exercise any right whatever under any settlement or occupation begun prior to May 15, 1915, on any lands shown on said plats; provided, however, that this shall not interfere with any valid existing rights obtained by settlement or entry while the land was subject thereto.

4. The limit of area per entry representing the acreage which, in the opinion of the Secretary of the Interior, may be reasonably required for the support of a family upon such lands is fixed at the amounts shown upon the plats for the several farm units. The maximum limit of area for which water-right application may be made for lands in private ownership shall be 160 acres of irrigable land for each landowner. Water-right applications for lands in private ownership may be made on and after the date of this notice. All water-right applications, whether for public or private lands, must be made to the project manager, United States Reclamation Service, Mitchell, Nebr.

5. The water-right charges per acre of irrigable land are of two kinds, (a) a charge, as hereinafter provided, for building of the irrigation system, termed the construction charge; and (b) an annual charge for operation and maintenance, payable March 1 of each year for the preceding irrigation season. The operation and maintenance charge for the irrigation season of 1915 shall be due March 1, 1916, and shall be of the amount and terms of payment announced for the said project.

6. For homestead entries made on and after August 13, 1914, and land in private ownership, which on and after August 13, 1914, is signed under contract with the North Platte Valley Water Users' Association, water-right applications will be accepted at a construction charge of \$55 per acre of irrigable land. An initial payment of 5 per cent, or \$2.75 per irrigable acre, on account of the construction charge shall be made at the time of entry or filing of water-right application, which application must be on the form provided under the reclamation extension act. The remainder of the construction charge, \$52.25 per irrigable acre, must be paid in 15 annual installments, the first five of which shall each be 5 per cent (or \$2.75 per acre each), and the remainder each 7 per cent (or \$3.85 per acre each). The first of said annual installments shall become due and payable on December 1 of the fifth calendar year after the initial installment, and subsequent installments shall become due on December 1 of each calendar year thereafter.

7. For lands shown on said plats and entered before August 13, 1914, or lands in private ownership which were subscribed to the North Platte Valley Water Users' Association before August 13, 1914, the construction charge shall be \$55 per acre of irrigable land shown on said plats, and graduated as follows: First installment, \$1; second installment, \$2; third installment, \$3; fourth installment, \$4; fifth installment, \$5; sixth installment, \$6; seventh installment, \$7; eighth installment, \$8; ninth installment, \$9; tenth installment, \$10. The first of such installments shall be paid at the time of filing water-right applications, and the second of such installments shall be due and payable on December 1 of the subsequent year, and subsequent installments shall become due and payable on December 1 of each year thereafter.

8. If said lands were, before August 13, 1914, subject to the terms and conditions of the reclamation law, and acceptance or water-right application under the terms of the reclamation extension act shall be duly filed within six months from the date hereof, the same being by means of a water-right application of the form provided for use under the reclamation extension act, the first installment of the construction charge shall be due on December 1, 1915, and subsequent installments on December 1 of each year thereafter. The first four of such installments shall each be 2 per cent (or \$1.10 per acre each), the next two installments shall each be 4 per cent (or \$2.20 per acre each), the next 14 installments each 6 per cent (or \$3.30 per acre each) of the total construction charge.

9. Any water-right applicant or entryman may, if he so elects, pay the whole or any part of the construction charges owing by him within any shorter period than that provided by the public notices and orders applicable to his land.

10. All charges must be paid at the project office of the United States Reclamation Service at Mitchell, Nebr. Drafts, money orders, etc., should be made payable to the "Special Fiscal Agent, United States Reclamation Service."

FRANKLIN K. LANE,  
*Secretary of the Interior.*

#### FINANCIAL STATEMENTS.

*Assets, liabilities, reserves, and capital, North Platte project, to June 30, 1915.*

##### ASSETS.

##### Accounts receivable:

Construction charges due and uncollected from water-right applicants.....	\$227, 712. 94	
Construction charges unaccrued on contracts with water-right applicants.....	4, 698, 118. 67	
Operation and maintenance charges due and uncollected from water-right applicants.....	5, 143. 89	
		<hr/> \$4, 930, 975. 50

##### Inventories:

Mechanical and other equipment.....	47, 628. 43	
Materials and supplies on hand in storehouses.....	24, 248. 21	
		<hr/> 71, 876. 64

##### Construction work contracted:

Unearned value of construction work contracted.....	18, 607. 57
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Construction work in process:

Gross expenditures for construction of project to date.....	\$6,844,771.82	
Less revenues earned during construction—		
Rentals of buildings.....	\$4,250.47	
Rentals of grazing and farming lands.....	6,756.04	
Rentals of irrigation water.....	19,328.30	
Contractors' freight refunds....	15,053.66	
Forfeitures by defaulting bidders and contractors.....	16,255.00	
Miscellaneous revenues.....	1,454.52	
Loss on mess house.....	<sup>1</sup> 11,685.62	
Profit on mercantile store.....	4,763.03	
Profit on hospital.....	5,852.31	
Adjustments: Loss on services of Government animals.....	<sup>1</sup> 1,204.07	
Total deductions.....	\$60,823.64	
Net expenditures for construction of project to date.....	\$6,783,948.18	
Deferred operation and maintenance revenues.....	27,023.49	
Total assets.....	11,832,431.38	

LIABILITIES, RESERVES, AND CAPITAL.

Accounts payable:

Unpaid progress earnings under construction contracts.....	\$12,777.87	
Unpaid contract holdbacks.....	43,203.06	
Unpaid labor.....	2,646.79	
Unpaid purchases.....	4,544.50	
Unpaid freight and express.....	9,633.35	
Unpaid passenger fares.....	450.91	
Unredeemed coupon books.....	26.50	
Unredeemed meal tickets.....	5.75	
Unpaid miscellaneous.....	22.94	
		73,311.67
Contingent obligations:		
Unearned value of construction work contracted....		18,607.57
Reserves for repayment to reclamation fund of cost of project:		
Value of construction contracts with water-right applicants.....	5,084,765.80	
Value of construction contracts with water-right applicants temporarily suspended.....	75,835.00	
Construction charges paid in advance by water-right applicants.....	120.88	
Construction charges paid and forfeited by water-right applicants.....	4,812.90	
Penalties on construction charges paid by water-right applicants.....	839.91	
		5,166,374.49
Net investment:		
Disbursements.....	\$7,024,662.96	
Transfers received from other projects.....	186,258.88	
		7,210,921.84
Collections.....	609,278.50	
Collections, repayment refunds.....	254.00	
Transfers issued to other projects....	27,251.69	
	636,784.19	
		6,574,137.65
Total liabilities, reserves, and capital investment of the Government.....		11,832,431.38

<sup>1</sup> Deduct.

*Functional feature costs of North Platte project to June 30, 1915.*

Examination and surveys.....	\$82,038.70
Storage system.....	2,557,513.18
Canal system.....	2,565,605.09
Lateral system.....	924,392.51
Drainage system.....	113,724.10
Farm units.....	42,911.95
Permanent improvements and land.....	57,369.17
Operation and maintenance (during construction).....	501,217.12
<b>Total.....</b>	<b>6,844,771.82</b>

*Operating revenues and expenses North Platte project to June 30, 1915.***EXPENSES.**

Storage system:	
Operation.....	\$13,068.17
Maintenance.....	2,810.20
Canal system:	
Operation.....	56,567.12
Maintenance.....	97,966.62
Lateral system:	
Operation.....	93,143.53
Maintenance.....	55,440.03
Drainage system, maintenance.....	687.25
<b>Total.....</b>	<b>319,682.92</b>

**REVENUES.**

Operation and maintenance charges accrued on contracts with water-right applicants.....	287,213.37
Operation and maintenance charges paid in advance by water-right applicants.....	526.29
Operation and maintenance charges paid and forfeited by water-right applicants.....	1,031.95
Rentals of irrigation water.....	3,258.25
Miscellaneous revenues.....	629.57
Deferred operation and maintenance revenues (carried to debit side of assets and liabilities statement).....	27,023.49
<b>Total.....</b>	<b>319,682.92</b>

*Estimated cost of contemplated works, North Platte project during fiscal year 1916.*

Storage system:	
Dam No. 3.....	\$8,200
Canal system:	
Third division main canal.....	4,000
Lateral system:	
First lateral district.....	\$1,500
Second lateral district.....	1,500
Third lateral district.....	6,500
	9,500
Drainage system.....	60,400
Farm units.....	1,000
Operation and maintenance.....	121,800
Stores and other operations (reimbursable accounts).....	8,000
Unallotted to features.....	59,100
<b>Total.....</b>	<b>272,000</b>

## NEVADA, TRUCKEE-CARSON PROJECT.

D. W. COLE, project manager, Fallon, Nev.

### LOCATION.

Counties: Churchill, Storey, and Lyon.  
Townships: 17 and 18 N., Rs. 17 to 30 E.; 19 N., Rs. 26 to 31 E.; 20 N., Rs. 22 to 31 E., Mount Diablo meridian.  
Railroad: Southern Pacific.  
Railroad stations and estimated population January 1, 1915: Fernley, 50; Hazen, 200; Fallon, 1,100; Lahontan, 20; and Stillwater, 50.

### WATER SUPPLY.

Source of water supply: Truckee and Carson Rivers.  
Area of drainage basin: 3,450 square miles.  
Annual run-off in acre-feet; Truckee River at Tahoe (519 square miles), 1901 to 1914, maximum, 704,000; minimum, 113,000; mean, 287,000. Truckee River near Vista and Clark (1,740 square miles), 1900 to 1914, maximum, 1,435,000; minimum, 356,000; mean, 833,000. Carson River at Empire (988 square miles), 1901 to 1914, maximum, 731,000; minimum, 172,000; mean 400,000.

### AGRICULTURAL AND CLIMATIC CONDITIONS.

Area for which service is prepared to supply water, season of 1915: 65,000 acres.  
Area under water-right applications and rental contracts season of 1915: 45,557 acres.  
Length of irrigation season: From April 1 to October 15—198 days.  
Average elevation of irrigable area: 4,000 feet above sea level.  
Average annual rainfall on irrigable area: 4 inches (maximum record 1913, 8.08 inches).  
Range of temperature on irrigable area: 0° to 100° F.  
Character of soil of irrigable area: Exceedingly variable; sand, sandy loam, clay, adobe, and volcanic ash.  
Principal products: Alfalfa, small grain, potatoes, onions, sugar beets, truck crops and dairy products.  
Principal markets: Nevada and Pacific coast communities.

### LANDS OPEN FOR IRRIGATION.

Dates of public notices and orders relating thereto: May 6, 1907; November 1, 1907; January 30, 1908; April 4, 1908; June 5, 1908; December 26, 1908; March 1, 1909; September 28, 1909; April 26, 1910; September 16, 1910; April 22, 1911; October 17, 1911; February 8, 1912; June 13, 1912; January 17, 1913; June 23, 1913; July 15, 1913; July 21, 1913; August 19, 1914; December 16, 1914; January 30, 1915; February 26, 1915; March 20, 1915, and May 13, 1915.

Location of lands opened: Ts. 17 to 20 N., Rs. 23 to 31 E., Mount Diablo meridian

#### *Present status of irrigable lands.*

	Acres.
Public homestead:	
Entered.....	18,401
Open to entry.....	4,340
Under water-rental contracts.....	15
Not shown on plats.....	100,764
Total homestead land.....	123,520

Indian:	Acres.
On approved plats.....	4,077
Not shown on plats.....	563
<b>Total Indian land.....</b>	<b>4,640</b>
<b>Total public land.....</b>	<b>128,160</b>
<b>Private:</b>	
Covered by water-right application.....	8,165
Open to water-right application.....	6,607
Not shown on plats.....	16,565
<b>Total subject to water right application.....</b>	<b>31,337</b>
Settled vested rights.....	13,033
Unsettled vested rights.....	6,390
<b>Total vested lands.....</b>	<b>19,423</b>
<b>Total private lands.....</b>	<b>50,760</b>
<b>State, not shown on plats, total.....</b>	<b>180</b>
<b>Railroad:</b>	
Covered by water-right application.....	1,945
Open to water-right application.....	1,745
Not shown on plats.....	23,210
<b>Total railroad lands.....</b>	<b>26,900</b>
<b>Total, entire project.....</b>	<b>206,000</b>

Limit of area of farm units: 40 to 160 acres.

Duty of water: 3 acre-feet per acre per annum at the farm.

Building charge per acre of irrigable land: \$22, \$30, and \$60.

Annual operation and maintenance charge per acre of irrigable land: Approximately \$1 per acre, based on cost of service.

### CHRONOLOGICAL SUMMARY.

Reconnaissance made and preliminary surveys begun in 1902.

Construction recommended by director March 7, 1903.

Construction conditionally authorized by Secretary, March 14, 1903.

Truckee Canal completed June, 1905.

Carson River headworks and main distributing canals completed September, 1905.

First irrigation by Reclamation Service, season of 1906.

Truckee Canal Chute completed November, 1910.

Lahontan Dam commenced January, 1911.

Lahontan Dam completed June, 1915.

Entire project 62.1 per cent completed June 30, 1915.

### IRRIGATION PLAN.

The irrigation plan of the Truckee-Carson project provides for the storage of water on the headwaters of Truckee River, in Lake Tahoe, in the alkali Flat Reservoir, near Churchill, Nev., and in Lahontan Reservoir on Carson River; the diversion of water from Truckee River by a dam about 20 miles below Reno, Nev., into the Truckee Canal, supplying water to lands in the Truckee and Carson River Valleys and to the Lahontan Reservoir; the diversion of water from Carson River by a dam near Dayton, Nev., for storage in Alkali Flat Reservoir and irrigating lands in Churchill Valley below that reservoir; and the diversion of water from Carson River by a dam about 5 miles below the Lahontan storage dam into two canal systems, one on either side of the river, watering lands in the lower Carson River Valley. The United States intends, for and in connection with the project, to use the waste, seepage, spring, and percolating water arising within the same, and asserts a right thereto by virtue of its reservation of all unappropriated waters of the project source of supply and of its appropriation of said waters in accordance with the State law heretofore made for the purposes of the project.

The features of the above irrigation plan which have been completed are: The dam at the outlet of Lake Tahoe, including the greater portion of the accessory dredging of the Truckee River channel; the diversion dam in Truckee River near Derby, Nev.; the Truckee Canal, carrying water from this diversion 31 miles to the terminal concrete chute discharging into the Lahontan Reservoir; the forebay for the hydroelectric plant discharging Truckee Canal water into Carson River below Lahontan Dam; the diversion dam in Carson River situated about 5 miles below Lahontan Dam; that portion of the irrigation system which includes laterals taking out of Truckee Canal in the vicinity of Fernley and Hazen; and the two main canals heading at Carson Diversion Dam and extending over the main portions of the project in Carson sink, with Fallon as a center.

Construction of Lahontan Dam and Reservoir was completed in June, 1915, for the conservation of the flood waters in both the Truckee and Carson Rivers.

The features remaining for future construction are: The Alkali Flat Reservoir, or equivalent reservoirs in the upper Carson Valley, as may later be determined; the upper Truckee storage reservoirs as required; the extension of the irrigation system to cover additional irrigable areas adjacent to and on all sides of the project as already constructed; and the extensions of the drainage system which may become necessary as supplemental construction in behalf of the water users under the provisions of the reclamation extension act.

### CONSTRUCTION DURING FISCAL YEAR.

*Lahontan Dam.*—The main structure with all principal accessory features was completed according to the plans and progress schedule about the end of the calendar year 1914. Substantially all quantities of material had been placed at this time, and the main construction force was dismissed early in January. During the remainder of the fiscal year a smaller force was employed in the installation of controlling devices; the completion of the grading of the grounds in the vicinity of the dam, including the adjoining dike; the construction of the public highway and bridge over the Truckee Canal opposite the dam; the completion of various features of the hydroelectric plant and in dismantling the camp and construction plant and putting the premises to rights generally.

A maximum force of about 300 men and 100 head of stock was employed during the summer and fall of 1914, with gradually reduced force after January, 1915, as the completion of the various incidental works was accomplished.

The entire work was completed and the last of the construction force dismissed on June 30, 1915, on which date also the mercantile store, mess house, and camp were closed.

Construction of this dam was commenced in 1911. The quantities of work involved were: Excavation, 284,000 cubic yards; embankment, 663,000 cubic yards; paving, 31,000 cubic yards; concrete, 70,800 cubic yards; and iron and steel, 1,600,000 pounds. The length of the dam is 1,300 feet; the maximum height, 124 feet above stream bed, in addition to 80 feet depth of cut-off wall extending below the bed of the river. The capacity of the resulting reservoir is 290,000 acre-feet of water.

More in detail the following work was done during the fiscal year: The main embankment was completed to full height, including graveling and quarried-rock paving of both the upstream and downstream slopes. The concrete spillways, spanned by 10 reinforced concrete arches forming the road over the top of the dam, were completed. The entire top of the dam was curbed and paved with concrete and provided with a massive concrete railing, carrying complete electric-light fixtures for the illumination of this roadway at night. The con-

crete gatehouse surmounting the outlet tower was built and the hydraulic oil-pressure apparatus was installed therein for the operation of the set of 16 outlet gates to be used in controlling the flow of water from the reservoir.

A special outlet tower, controlling gate, and reinforced concrete pipe 4 feet in diameter were built into the dam for the purpose of supplying water from the reservoir for the operation of the hydroelectric plant at times when the main supply from the Truckee Canal will not be available.

The reinforced concrete siphon pipe, 4 feet in diameter, with various controlling gates and outlets, was completed for taking water from the main Truckee Canal across and beneath the bed of Carson River to the Lahontan Bench Canal south of Carson River. The Lahontan Bench Canal beyond the siphon was completed by heavily graveling the dike three-fourths of a mile long, which forms the canal levee and at the same time acts as an extension of the main dam, 4 feet in height across the mesa, for completing the reservoir.

The preliminary estimate of cost for the dam and all accessory works as described was \$1,573,000; the final cost of constructing these works complete is \$1,476,000.

The completion of the dam was immediately followed by the storage of the surplus waters of the Carson River spring floods, which, in conjunction with the surplus flow from Truckee Canal, filled the reservoir to about two-thirds of its depth and one-third of its capacity. This storage of water insured an ample supply for irrigation throughout the season of 1915, with the possibility of carrying forward surplus storage for next year, if this shall seem desirable.

*Lahontan hydroelectric power plant.*—The Lahontan electric power plant, which was built mainly to save expense for power in constructing the dam, continued to furnish ample motive power throughout the construction period. In the latter part of 1914 an opportunity was presented for leasing the power plant advantageously. After due advertising the proposal of the Canyon Power Co., of Oakland, Cal., was accepted for leasing the plant for a period of 10 years. The terms of the contract provide for complete operation and maintenance of the plant by the lessee with minimum monthly payments to the United States under the unit-price schedule for all power developed. Reservation of 100-kilowatt capacity was made for project uses at the minimum rate. The lessee furthermore contracted to install a third power unit, identical with the other two units, to become the property of the United States upon payment therefor by crediting 75 per cent of the monthly earnings of the plant. All work of completing this third power unit was done by the lessee during the last half of the fiscal year. The power plant has been operated by the lessee beginning December 1, 1914, and has thus become a valuable asset, yielding a substantial revenue to the project for crediting to the operation and maintenance account of the irrigation system.

*Lateral construction.*—The construction of the "H" lateral of 50 second-foot capacity in the southeastern portion of the project was completed, including farmers' take-out structures and a flume about 100 feet long for carrying the lateral across a slough.

A number of extensions of other smaller laterals were made south and southwest of Fallon, and also in the vicinity of Fernley, for



supplying water to second unit lands which were entered under public notice of August 19, 1914.

*Lake Tahoe Reservoir.*—As a result of prolonged negotiations with the Truckee River General Electric Co., agreement was reached upon the terms of a decree to be entered in the condemnation suit whereby the United States sought to acquire ownership and control of the Lake Tahoe outlet dam. The decree was entered by consent of the parties in the United States court at San Francisco on June 4, 1915. Full payment of \$139,500 was made by the United States on June 28, upon which date the final order of the court placed the United States in exclusive possession of the lake outlet property. The custody of the controlling works passed from the Truckee River General Electric Co. to the project manager for the United States Reclamation Service on July 1, 1915.

#### **DRAINAGE.**

The first southeast drain, comprising 2.2 miles of 10, 12, and 15 inch tile, laid in an 8-foot trench, was completed and has been in operation continuously, the water being lifted at the lower end about 5 feet and discharged into an open-cut drain, which in turn has been deepened and diverted into the main L Canal a mile and a quarter eastward from the pumping station.

After completing this tile drain, the excavating machine was kept at work in cleaning and deepening about 35,000 linear feet of the surface drains south and east of Fallon. The excavation averaged about 2 cubic yards to the linear foot. The cost was approximately 15 cents per linear foot, or  $7\frac{1}{2}$  cents per cubic yard. The lands tributary to these deepened drains have been distinctly benefited by the outlet of seepage water.

#### **OPERATION AND MAINTENANCE.**

*Water supply.*—The irrigation season of 1914 found the project with an abundant water supply. Snowfall of the previous winter accumulated to the depth of 214 inches at the summit observation station, with corresponding accumulations elsewhere on the watersheds of the two rivers. There resulted a flow of streams well above the average, and Lake Tahoe, which had been depleted to the lowest level in many years, was filled again to the high-water mark early in July. Lahontan Dam was at that time sufficiently advanced in construction to enable ample storage of water for supplying the lower portion of the project.

The snow accumulation early in 1915 reached 187 inches, but the resulting yield of streams was below normal, and the water supply for the 1915 irrigation season was less abundant than in 1914. The available storage in the completed Lahontan Reservoir, however, has insured against any water shortage in the main portion of the project served by it.

Moreover, the control of Lake Tahoe, supplemented by the adjudication of rights in Truckee River water, which is now in the United States court at Carson City, has gone far toward the insurance of the water supply for lands directly under Truckee Canal.

*Use of water.*—The net delivery of water to project lands in 1914 was 94,730 acre-feet, with water duty of 3.28 acre-feet for the season, compared to corresponding figures for 1913 of 69,798 acre-feet, with

2.26 acre-feet water duty. The water duty of 1913 was the maximum of record on the project. The water duty of 1914, although less satisfactory, was better than in previous years of abundant water supply, and shows that an effort is being made by water users to improve their methods.

The main Truckee Canal was operated continuously for irrigation and power development with incidental carriage of surplus water to Lahontan Reservoir. The main canals taking out of Carson River were operated for supplying the extensive lateral system, covering approximately 40,000 acres of irrigated lands centering at Fallon. The operation of the system was in charge of a water master at Fallon, assisted by 8 to 10 district ditch tenders, who by means of systematic rotation were enabled to supply the individual needs of the farmers in turn.

The maintenance of the distribution system was carried on as usual by a small organization of men and animals, with headquarters at Fallon and extending to all parts of the project, through the cooperation of farmers with their teams when required for supplementary work.

A substantial feature of maintenance work was the repair of ditches, due to breaks in levees caused by gophers, this pest being responsible for a large portion of the expense of upkeep on the project. Some relief was obtained by trapping and poisoning.

The growth of tules, moss, and other vegetation in laterals and drains was another source of expense. The modes of attack were with disk harrows or heavy marine chains dragged through the waterways by a team on each bank. Some handwork was also found necessary. The disk harrow was the most effective and economical method tried.

The maintenance force did a large amount of work in the enlargement of checks and gates for increasing the capacity of water delivery to farmers who are using progressively larger irrigating heads.

Other considerable structure work was in building culverts in the deepened drains under laterals and highways.

Pasturage of sheep and cattle on the ditch banks was one method tried with some success for keeping down vegetation and suppression of the gophers.

*Historical review, Truckee-Carson project.*

Item.	1910	1911	1912	1913	1914	<sup>1</sup> 1915
Acreage for which service was prepared to supply water.....	52,039	52,039	52,039	52,039	52,039	65,000
Acreage irrigated.....	27,557	30,139	36,620	43,075	43,075	44,000
Number of farms irrigated.....	415	469	497	494	494	540
Miles of canal operated.....	280	292	294	295	295	300
Water diverted (acre-feet).....	177,576	262,619	170,763	186,175	225,000	.....
Water delivered to land (acre-feet).....	128,249	143,746	62,707	69,798	94,730	.....
Per acre of land irrigated (acre-feet).....	4.65	4.46	2.50	2.26	3.28	.....

<sup>1</sup> To June 30.

### SETTLEMENT.

After about four years during which project lands were withdrawn from entry and water-right application, pending the construction of Lahontan storage reservoir, public notice was issued on August 19, 1914, whereby approximately 12,000 acres of land, both in public and

private ownership, were opened for irrigation under the project. A great deal of interest was manifested in this opening of new lands, but many of those who came to investigate concluded not to remain. Quite a number of new settlers on public lands, however, had entered before the close of the fiscal year. There were, previous to June 30, 1915, 38 homestead entries and 11 entries of private lands, the construction charge in both cases being at the second unit rate of \$60 per acre, with initial payment of one-twentieth of the total amount.

Many prospective settlers appeared to be disappointed in finding the probable expense of leveling the land, providing buildings, equipment, and stock and maintaining their families so formidable, and they were unwilling to make the attempt. Furthermore, the conditions of the local markets with the price of the principal crop, alfalfa hay, at its lowest ebb in many years, and the generally depressed tone of the community seemed to react upon the spirits of newcomers to their discouragement. Notwithstanding this 50 new settlers, a 10 per cent increase, established themselves on the project in the 10 months ending June 30, 1915.

*Settlement data, Truckee-Carson project.*

Item.	1912	1913	1914	1915
Total number of farms on project.....	497	494	494	540
Population of.....		1,635	1,635	1,867
Number of irrigated farms.....		494	494	540
Operated by owners or managers.....		439	439	480
Operated by tenants.....		55	55	60
Population of.....		1,635	1,635	1,867
Number of towns.....	4	4	4	4
Population of.....		1,250	1,250	1,400
Total population in towns and on farms.....		2,885	2,885	3,267
Number of public schools.....	18	18	19	20
Number of churches.....	7	8	8	8
Number of banks.....	1	1	1	1
Total capital stock.....	\$100,000	\$100,000	\$100,000	\$100,000
Total amount of deposits.....	\$260,000	\$300,000	\$350,000	\$300,000
Total number of depositors.....	550	600	650	700
Number of relinquishments.....	41	12	3	8

**PRINCIPAL CROPS.**

Alfalfa constitutes the great staple crop of this section, with barley, wheat, potatoes, and truck crops following in the order named. The beet-sugar industry remained under a cloud owing to the inability of the Nevada Sugar Co. to reorganize and finance their factory. No crop of beets was planted in 1915, but hopes are held out for rehabilitation of the industry next year.

In the meantime the dairying industry has come to the front as the most promising feature of project enterprise. The basis of dairying is found in the new and well-equipped creamery of the Churchill Creamery Co., with Mr. George Wingfield at the head. The company in conjunction with the operation of its plant loans money for the purchase of milk cows by the farmers, payments being made of principal and interest through deduction from the cream checks of the farmers. A rapid increase in the number of dairy stock occurred during the year, the total number of milk cows now on the project approximating 2,000. The cows are mainly Holstein and Jersey grades, although many thoroughbreds are kept, and improvement in breeding is in progress.

The 1914 crop census indicated a falling off in total value of crops, notwithstanding a substantial increase in the total yield. This was due to the very low prices which the market afforded.

*Crop report, Truckee-Carson project, Nevada, year of 1914.*

Irrigated crop.	Area (acres).	Unit.	Yields.		Values.		
			Total.	Average per acre.	Per unit.	Total.	Per acre.
<b>Crops in full production:</b>							
Alfalfa (old).....	18,212	Tons....	59,873	3.28	\$5.00	\$299,365	\$16.43
Barley.....	1,339	Bushels.	31,084	23.4	.60	18,650	14.03
Garden.....	646					26,791	41.44
Oats.....	417	Bushels.	18,000	43	.40	7,200	17.26
Onions (market).....	20	do.....	7,600	380	.60	4,560	228.00
Potatoes (common).....	283	do.....	23,800	84	.48	11,424	40.36
Wheat.....	1,446	do.....	29,164	20.1	1.35	39,371	27.22
Total.....	22,353		Total and average for crops in full production			407,361	18.22
<b>Crops not in full production:</b>							
Alfalfa (seeded 1914).....	3,344	Tons....	1,129	0.3	5.00	5,645	1.68
Hay (except above).....	1,594	do.....	1,504	.9	3.00	4,512	2.88
Pasture.....	19,398					23,500	1.21
Less duplicated areas.....	7,374						
Total cropped acreage...	39,285		Total and average for all crops.....			441,018	11.23
<b>Irrigated, not cropped:</b>							
Nonbearing orchard.....	231						
Grand total irrigated...	39,516						

Areas.	Acres.	Farms.	Per cent of project.
Total irrigable area farms reported.....	52,039	504	25
Total irrigated area farms reported.....	39,516	504	19
Under water-right applications and contracts.....	28,419	491	14
Under rental applications.....	107	5	.....
Under unsettled Carson rights.....	10,990	12	5
Total cropped area farms reported.....	39,285	504	19

<sup>1</sup> Value in stack.

#### PUBLIC NOTICE DATED AUGUST 19, 1914.

In pursuance of the provisions of section 4 of the reclamation act of June 17, 1902 (32 Stat., 388), and acts amendatory thereof and supplementary thereto, notice is hereby given that water will be furnished under the Truckee-Carson project, Nevada, in the irrigation season of 1915 and thereafter for the irrigible lands of the second unit of said project designated upon farm unit plats of Mount Diablo meridian: Township 20 north, range 24 east; township 19 north, range 27 east; township 17 north, range 28 east; township 18 north, range 28 east; township 19 north, range 28 east; township 17 north, range 29 east, approved by the Secretary of the Interior, August 17, 1914, on file at the office of the project manager and at the local land office at Carson City, Nev.

Homestead entries of the farm units in said second unit, embracing public lands of the United States shown on said plats may be made in the manner, and on and after the date fixed therefor in the land-office notice hereinbelow, under the provisions of said act and acts amendatory thereof and supplemental thereto; and water-right appli-

cation therefor must be made to the project manager prior to such entry, accompanied by the first installment of the construction charge hereinafter described.

The limit of area per unit representing the acreage which, in the opinion of the Secretary of the Interior, may be reasonably required for the support of a family upon lands is fixed at the amount shown upon the plats for the several farm units.

Water-right applications for lands in private ownership included in said second unit may be made on or after September 14, 1914. The limit for which water-right application may be made for lands in private ownership shall be 160 acres of irrigable land for each land owner.

The charges per acre of irrigable land upon said entries and upon all other lands in said second unit shown upon said plats are of two kinds—namely (a) a charge of \$60 per acre for the building of the irrigation system, termed the construction charge; (b) an annual charge for operation and maintenance payable December 1 of each year. Each acre of irrigable land, whether irrigated or not, shall be charged with a minimum operation and maintenance charge which shall be the charge for one acre-foot of water.

An initial payment of \$3 per irrigable acre shall be made on account of the construction charge at the time of making a water-right application or entry of a farm unit. The remainder of the construction charge, \$57 per irrigable acre, shall be paid in 15 annual installments, the first 5 of which shall be \$3 each and the remainder \$4.20 each. The first of the said annual installments shall become due and payable on December 1 of the fifth calendar year after the initial installment, and subsequent installments shall become due on December 1 of each calendar year thereafter. Any water-right applicant may, if he so elects, pay the whole or any part of the construction charges owing by him within a shorter period.

In all cases where application for water right for lands in private ownership or lands held under entries not subject to the reclamation law shall not be made within one year after the date of this notice, the construction charges for such land shall be increased 5 per cent each year until such application is made and an initial installment is paid.

The method of determining the amount chargeable for operation and maintenance, and the penalties for failure to pay the construction charges and the operation and maintenance charges when due, are prescribed by act of Congress of August 13, 1914 (Public No. 170).

FRANKLIN K. LANE.

DEPARTMENT OF THE INTERIOR,  
*Washington, August 18, 1914.*

The COMMISSIONER, GENERAL LAND OFFICE.

SIR: It is directed that the farm units within the second unit of the Truckee-Carson reclamation project, in Nevada, be opened to settlement and entry under the provisions of the reclamation act of June 17, 1902 (32 Stat., 388), and acts amendatory, and be settled upon, occupied, and entered in the following manner and not otherwise:

1. *Application for registration.*—Any person who is qualified to make entry under the reclamation act may present an application for

registration for any farm unit, which must be fully and specifically described according to legal subdivision, section, township, and range, and also by farm-unit description. An applicant must swear to and present his application for registration at Fallon, Nev., on or after September 2 and not later than September 16, 1914, Sundays excepted, before an authorized notary public, must deposit a sum equal to 5 per cent of the construction charge for the unit applied for with the special fiscal agent of the United States Reclamation Service at Fallon, and must deliver the application, properly executed, to the officer in charge of the opening, or to some person designated by him to receive such application, at Fallon. No person shall be permitted to present an application for registration by agent or through the mail, or to present more than one application, or to swear to his application elsewhere than at Fallon, or before or after the dates mentioned, and no person shall be permitted to present an application who is not qualified to make entry under the reclamation act.

2. *Form of deposit.*—The deposit required must be in cash, by a certified check on a national or state bank or trust company which can be cashed without cost to the Government, or by a post-office money order, made payable to the said special fiscal agent. Payment will not be accepted in any other form.

3. *Examination of lands.*—Applicants may examine the lands before presenting their applications for registration but will not be required to. Those who do not, and who secure the right to make entry, must examine the lands before presenting their applications to enter, as they must swear in those applications that they have examined and are familiar with each legal subdivision of the land applied for.

4. *Designation of notaries public.*—No notary public shall be designated to administer oaths to applicants for registration who was not appointed prior to the date of the approval of these regulations and was not on that date an actual resident of Churchill County, Nev. The officer in charge of the opening is hereby authorized and directed to prescribe such rules and regulations governing the action of such notaries in relation to the registration as may in his judgment be necessary. All qualified notaries who apply for designation to the said officer at Fallon on or after August 29, and agree to comply with the rules and regulations prescribed by him, shall be designated. No other application for designation need be made.

5. *Wall map for public inspection.*—A large wall map corrected each day to indicate the whole number of applications presented for each unit from the first day of the registration to the close of that day shall be conspicuously posted for public inspection.

6. *Drawing and dates for entries.*—A public drawing will be conducted at the said city of Fallon beginning at 10 o'clock a. m. on September 18, 1914, at which not exceeding three applications for each tract will be impartially drawn and lettered. If but one application was presented for any tract, it shall be lettered "A." If two or more applications were presented for any tract, before the applications are drawn and lettered each one shall be inclosed in a separate envelope, which shall not indicate on the outside the name of the applicant. If two applications were presented for any tract, the first one drawn shall be lettered "A," the second "B"; if three or more were presented, the first one drawn shall be lettered "A," the

second, "B," and the third "C." The name and address of each applicant whose application is lettered, the letter assigned, and a full and specific description of the tract applied for shall be publicly announced when the application is lettered. The applicants for each tract will thereafter be known as "A," "B," and "C." "A" may, if qualified, make entry for the tract applied for on or after September 21 and not later than October 10. If he does not, "B" may do so, if qualified, on or after October 12 and not later than October 31. If both "A" and "B" fail, "C" may, if qualified, make entry for that tract on or after November 2, but not later than November 21. "B" may make entry for the tract applied for only if "A" fails to make entry; "C," only if both "A" and "B" fail.

7. *Notices to persons whose applications are lettered.*—A notice will be mailed to each person whose application is lettered showing the letter assigned and fully and specifically describing the tract applied for. A copy of these regulations will be inclosed with the notice. No further notice will be mailed to the "A" applicants, but the "B" and "C" applicants will each be notified as soon as possible whether they may make entry. These subsequent notices will be mailed to "B" applicants on or before October 12 and to the "C" applicants on or before November 2. If a "B" or "C" applicant does not receive his subsequent notice after waiting a reasonable time after the date mentioned for it to reach him through the mail, he should write and ask the register and receiver of the United States land office at Carson City, Nev., as to his right to make entry under his letter. An applicant will not be permitted to make entry after the time allowed on account of the miscarriage of his notice in the mails or on account of any other delay.

8. *Return of deposits.*—As soon as possible after the drawing the special fiscal agent will return the deposits made by all persons whose applications were not selected and lettered and notify them that they were unsuccessful. He will not return the deposits made by persons whose applications for any tract were lettered until entry has been made for that tract or the time has expired in which entry may be made for that tract under any lettered application, but will return unused deposits as soon as possible after such time. No deposit will be returned until after collection has been made, if tender was in any form other than cash or post-office money order.

9. *Presentation of applications to enter.*—In order to make entry under a letter assigned, applicants must, within the time allowed, present a properly executed application for water right to the project manager of the United States Reclamation Service at Fallon and a proper application to enter to the register and receiver of the United States land office at Carson City. The application to enter may be sworn to before the register or the receiver, or before a United States commissioner or a judge or clerk of a court of record residing in the county in which the land is situated, or before any such officer who resides outside the county and in the Carson City land district and is nearest and most accessible to the land. A certificate from the project manager showing that a proper application and the necessary payment for construction charge have been made must be filed with the application to enter. If an applicant must make any special showing, such as evidence of citizenship or the right to make second entry, it must also be filed with the application to enter.

10. *Requirements of entrymen.*—Persons making entry of these units will be required to comply with all the terms and conditions of the homestead laws, and before patents are issued they will be required to reclaim one-half of the irrigable area of the land entered and to pay the construction charge fixed in the public notice and the yearly operation and maintenance charge determined from time to time.

11. *Death of applicant.*—If any person dies after obtaining the right to make entry for any unit and before the time allowed for entry has expired, his widow or any one of his heirs may make entry under the letter assigned in her or his own right, within the time allowed, but not thereafter. Where such entry is made the deposit made by the deceased applicant will be returned to his estate, and the person who makes entry must himself make the first payment on the construction charge for the unit applied for. Such person must furnish with his application to enter his affidavit, corroborated by the affidavit of at least one person, showing the fact and time of the successful applicant's death.

12. *Rejected applications.*—If an applicant applies to make entry under a letter assigned to him, within the time allowed, and the application is rejected by the register and receiver, subject to the right of appeal, the next applicant for that tract, if any, will be notified that he may, if he desires, present an application to enter it, subject to the right of the prior applicant under the rejected application.

13. *Form of application for registration.*—The following form is prescribed as the application for registration:

I, \_\_\_\_\_, of \_\_\_\_\_  
(Street and number or other address.)

\_\_\_\_\_ (City or town.) \_\_\_\_\_ (County.) \_\_\_\_\_ (State.)  
age \_\_\_\_\_ years, height \_\_\_\_\_ feet, \_\_\_\_\_ inches, and weight \_\_\_\_\_  
pounds, in support of this, my application for registration for tract  
No. \_\_\_\_\_

\_\_\_\_\_ or farm unit \_\_\_\_\_, embracing the \_\_\_\_\_  
section \_\_\_\_\_, township \_\_\_\_\_ N., range \_\_\_\_\_ E., Mount Diablo  
meridian, do solemnly swear that I am a citizen of the United States,  
or have declared my intention to become such; that I am not the  
owner of more than 160 acres of land in the United States, and have  
not heretofore made any entry or acquired any title to public lands  
which disqualifies me from making entry under the reclamation act;  
that I honestly desire to enter public lands for my own personal use  
as a home and for settlement and cultivation, and not for speculation  
or in the interest of some other person; that I present this application  
for that purpose only and have not presented and will not present  
any other affidavit of this kind.

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The foregoing was subscribed and sworn to before me after it was  
read to or by affiant, at Fallon, Nev., September \_\_\_\_\_, 1914.

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Notary Public.



UNITED STATES RECLAMATION SERVICE,  
Fallon, Nev., September . . . . ., 1914.

The above-named applicant has deposited with me a sum equal to 5 per cent of the construction charge for the above-described unit, for which I have this day issued receipt No. . . . . for \$ . . . . .

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*Special Fiscal Agent.*

14. *Units not entered under lettered applications.*—The units which are not entered under lettered applications, if any, will become subject to appropriation under laws applicable, by any qualified persons, at 9 o'clock a. m., on November 23, 1914, and not before.

Very respectfully,

FRANKLIN K. LANE.

*Truckee-Carson project, second unit—Public land, farm units.*

Tract No.	Township.	Range.	Section.	Unit.	Irrigable area.	Amount first payment.
1	20 N.	24 E.	10	G	47	\$141.00
2	20 N.	24 E.	12	J	58	174.00
3	20 N.	24 E.	12	K	44	132.00
4	20 N.	24 E.	12	L	63	189.00
5	20 N.	24 E.	24	D	40	120.00
6	20 N.	24 E.	24	E	40	120.00
7	19 N.	27 E.	6	B	40	120.00
8	19 N.	27 E.	6	C	36	108.00
9	19 N.	27 E.	8	G	40	120.00
10	19 N.	27 E.	8	H	40	120.00
11	19 N.	27 E.	8	J	40	120.00
12	19 N.	27 E.	8	K	40	120.00
13	19 N.	27 E.	14	G	37	111.00
14	19 N.	27 E.	14	H	33	99.00
15	19 N.	27 E.	18	J	48	144.00
16	19 N.	27 E.	18	K	40	120.00
17	19 N.	27 E.	18	L	35.12	105.36
18	19 N.	27 E.	18	M	35.06	105.18
19	19 N.	27 E.	18	N	40	120.00
20	19 N.	27 E.	18	P	64	192.00
21	19 N.	27 E.	18	R	63	189.00
22	19 N.	27 E.	18	S	37	111.00
23	19 N.	27 E.	18	T	34.99	104.97
24	19 N.	27 E.	18	U	34.93	104.79
25	19 N.	27 E.	18	V	38	114.00
26	19 N.	27 E.	22	B	28	84.00
27	19 N.	27 E.	24	C	44	132.00
28	19 N.	27 E.	24	D	40	120.00
29	19 N.	28 E.	17	D	61	183.00
30	19 N.	28 E.	17	E	64	192.00
31	19 N.	28 E.	17	G	69	207.00
32	19 N.	28 E.	18	B	62	186.00
33	19 N.	28 E.	18	E	32	96.00
34	19 N.	28 E.	18	F	36	108.00
35	19 N.	28 E.	18	G	50	150.00
36	19 N.	28 E.	18	H	40	120.00
37	19 N.	28 E.	20	F	37	111.00
38	19 N.	28 E.	20	G	35	108.00
39	19 N.	28 E.	20	H	43	135.00
40	19 N.	28 E.	20	J	66	198.00
41	19 N.	28 E.	20	K	49	147.00
42	19 N.	28 E.	20	L	58	174.00
43	19 N.	28 E.	20	M	34	102.00
44	19 N.	28 E.	20	N	32	96.00
45	19 N.	28 E.	21	G	63	189.00
46	19 N.	28 E.	21	H	72	216.00
47	19 N.	28 E.	21	J	51	153.00
48	19 N.	28 E.	21	K	71	213.00
49	19 N.	28 E.	24	H	63	189.00
50	19 N.	28 E.	24	J	80	240.00
51	19 N.	28 E.	26	H	34	102.00
52	19 N.	28 E.	30	H	41	123.00
53	19 N.	28 E.	30-31	F	66	198.00
54	19 N.	28 E.	31	D	37	111.00

*Truckee-Carson project, second unit—Public land, farm units—Continued.*

Tract No.	Township.	Range.	Section.	Unit.	Irrigable area.	Amount first payment.
55	19 N.	28 E.	31	E	38	114.00
56	19 N.	28 E.	32	L	72	216.00
57	19 N.	28 E.	32	M	29	87.00
58	19 N.	28 E.	32	N	48	144.00
59	19 N.	28 E.	33	E	79	237.00
60	19 N.	28 E.	33	F	68	204.00
61	19 N.	28 E.	33	G	35	105.00
62	19 N.	28 E.	33	H	34	102.00
63	19 N.	28 E.	35	J	48	144.00
64	18 N.	28 E.	4	L	65	195.00
65	18 N.	28 E.	4	M	65	195.00
66	18 N.	28 E.	4	N	35	105.00
67	18 N.	28 E.	4	P	37	111.00
68	18 N.	28 E.	4	R	60	180.00
69	18 N.	28 E.	4	S	30	90.00
70	18 N.	28 E.	5	L	35	105.00
71	18 N.	28 E.	5	M	37	111.00
72	18 N.	28 E.	5	N	52	156.00
73	18 N.	28 E.	5	P	65	195.00
74	18 N.	28 E.	5	R	60	180.00
75	18 N.	28 E.	5	S	66	198.00
76	18 N.	28 E.	5	T	80	240.00
77	18 N.	28 E.	5	U	68	204.00
78	18 N.	28 E.	6	F	58	174.00
79	18 N.	28 E.	6	G	54	162.00
80	18 N.	28 E.	6	H	69	207.00
81	18 N.	28 E.	9	M	40	120.00
82	18 N.	28 E.	9	N	67	201.00
83	18 N.	28 E.	9	P	40	120.00
84	18 N.	28 E.	9	R	66	198.00
85	18 N.	28 E.	9	S	37	111.00
86	18 N.	28 E.	9	T	32	96.00
87	18 N.	28 E.	10	J	69	207.00
88	18 N.	28 E.	10	K	36	108.00
89	18 N.	28 E.	10	L	37	111.00
90	18 N.	28 E.	10	M	38	114.00
91	18 N.	28 E.	10	N	38	114.00
92	18 N.	28 E.	15	G	39	117.00
93	18 N.	28 E.	15	H	40	120.00

**PUBLIC NOTICE DATED DECEMBER 16, 1914.**

1. In pursuance of the provisions of section 4 of the reclamation act of June 17, 1902 (32 Stat., 388), and acts amendatory thereof and supplementary thereto, including the reclamation extension act of August 13, 1914 (Public No. 170), notice is hereby given that water will be furnished under the Truckee-Carson project, Nevada, in the irrigation season of 1915 and thereafter for farm unit G, N.  $\frac{1}{4}$  SW.  $\frac{1}{4}$ , sec. 36, and farm unit E, N.  $\frac{1}{4}$  SW.  $\frac{1}{4}$ , sec. 35, township 19 north, range 29 east, M. D. M., approved by the Secretary of the Interior September 6, 1911, as amended November 25, 1914, on file at the office of the project manager, Fallon, Nev., and at the local land office at Carson City, Nev.

2. Homestead entries of these farm units may be made on and after January 6, 1915, at 9 o'clock a. m., at the local land office at Carson City, Nev., if found regular and accompanied by the certificate of the project manager showing that water-right application has been filed and the proper water-right charges deposited.

3. Warning and notice are hereby expressly given that no person will be permitted to gain or exercise any right whatever under any settlement or occupation begun or under any filing or entry made or attempted to be made in pursuance of the provisions of the reclamation act, or otherwise, prior to January 8, 1915, on either of

said farm units, and all such settlement or occupation, filing or entry, is hereby forbidden: *Provided, however,* That this shall not interfere with any valid existing rights obtained by settlement or entry while the land was subject thereto.

4. The limit of area per entry representing the acreage which, in the opinion of the Secretary of the Interior, may be reasonably required for the support of a family upon the lands, is fixed at the amount shown upon the plat for the said farm units.

5. The charges per acre of irrigable land within said farm units are of two kinds—namely, (a) a charge of \$60 per acre for the building of the irrigation system, termed the construction charge; (b) an annual charge for operation and maintenance due March 1 of each year. The operation and maintenance charge for the irrigation season of 1915 will be due and payable March 1, 1916, and the amount thereof will be hereafter announced. Each acre of irrigable land, whether irrigated or not, shall be charged with a minimum operation and maintenance charge fixed at the annual operation and maintenance charge for 1 acre-foot of water.

6. An initial payment of \$3 per irrigable acre shall be made on account of the construction charge at the time of making a water-right application or entry of a farm unit. The remainder of the construction charge, \$57 per irrigable acre, shall be paid in 15 annual installments, the first 5 of which shall be \$3 each and the remainder \$4.20 each. The first of the said annual installments shall become due and payable on December 1 of the fifth calendar year after the initial installment, and subsequent installments shall become due on December 1 of each calendar year thereafter. Any water-right applicant may, if he so elects, pay the whole or any part of the construction charges owing by him within a shorter period.

7. The method of determining the amount chargeable for operation and maintenance, and the penalties for failure to pay the construction charges and the operation and maintenance charges when due, are prescribed by act of Congress of August 13, 1914 (Public, No. 170).

FRANKLIN K. LANE,  
*Secretary of the Interior.*

#### ORDER DATED JANUARY 30, 1915.

Public notices issued prior to August 19, 1914, and farm-unit plats applicable thereto and heretofore filed, in connection with the project, under the provisions of the reclamation act of June 17, 1902 (32 Stat., 388), and acts of Congress amendatory thereof or supplementary thereto, are hereby withdrawn as to all farm units shown on such plats for which entry has not been made or for which application for entry has not been heretofore filed, and as to lands in private ownership shown on such plats for which water-right applications have not been made; and it is hereby ordered that no applications for entry or water-right applications may be accepted for such farm units or lands in private ownership until further notice.

FRANKLIN K. LANE,  
*Secretary of the Interior.*

**PUBLIC NOTICE DATED FEBRUARY 26, 1915.**

1. Under the terms of existing public notices and orders, the operation and maintenance charges for the irrigation season of 1914 for the Truckee-Carson project, Nevada, became due December 1, 1914.

2. In pursuance of the provisions of the reclamation act of June 17, 1902 (32 Stat., 388), and acts amendatory thereof and supplemental thereto, and in particular the reclamation extension act of August 13, 1914 (38 Stat., 686), section 6 of which authorizes the Secretary of the Interior to fix the due date for operation and maintenance charges, notice is hereby given that the operation and maintenance charge for the said project, which under existing public notice became due December 1, 1914, is postponed to and shall become due on March 1, 1915, and all operation and maintenance charges hereafter made against lands under the said project shall become due on March 1 of each year thereafter until further notice.

3. Hereafter no operation and maintenance charge shall be collected at the time water-right application is filed, but the first payment on account of operation and maintenance shall become due on March 1 of the year following the calendar year in which same was made; provided, however, that if original homestead entry or original water-right application be filed after June 15 in any year, the first payment on account of operation and maintenance will not become due until March 1 of the second calendar year following the date of entry.

4. For the operation and maintenance charge due March 1, 1915, no discount will be allowed for payment prior to such date, but penalties as prescribed by the extension act will attach. As to the operation and maintenance charges due March 1, 1916, and thereafter, the discount for payment made on or before the due date and the penalties for failure to make payment before the first day of the third calendar month after the due date will be applied as provided in section 6 of the said reclamation extension act. The penalties and discounts herein provided for attach for all lands, whether acceptances of the extension act have been filed or not.

5. The operation and maintenance charges for the irrigation season of 1915 shall be due March 1, 1916, and each acre of irrigable land, whether irrigated or not, shall be charged with a minimum operation and maintenance charge of 90 cents, which will permit delivery of not more than 1 acre foot per acre. Should further quantities be needed they will be furnished at the rate of 10 cents per acre-foot.

6. The provisions of this public notice shall apply to all lands subject to public notice heretofore issued for the said project.

7. Except as hereinabove provided, all the terms and provisions of existing public notices and orders for the said project shall remain unchanged.

A. A. JONES,  
*First Assistant Secretary.*

**FINANCIAL STATEMENTS.***Assets, liabilities, reserves, and capital, Truckee-Carson project, to June 30, 1915.***ASSETS.**

Cash with employees for transfer to special fiscal agent.....		\$319. 10
Accounts receivable:		
Construction charges due and uncollected from water-right applicants.....	\$4, 582. 28	
Construction charges unaccrued on contract with water-right applicants.....	596, 308. 42	
Operation and maintenance charges due and uncollected from water-right applicants.....	10, 276. 32	
Uncollected rentals of grazing and farming lands....	835. 15	
Uncollected rentals of power and light.....	1, 187. 46	
Uncollected rentals of irrigation water.....	28. 50	
Uncollected miscellaneous items.....	1, 027. 15	
		<u>614, 245. 28</u>
Inventories:		
Government animals.....	10, 226. 26	
Mechanical and other equipment.....	134, 891. 71	
Material and supplies on hand in storehouses.....	9, 247. 49	
Goods in transit.....	88. 75	
Unadjusted transfer between projects.....	354. 90	
Undistributed cost (freight and handling).....	<sup>1</sup> 2, 573. 27	
		<u>152, 235. 84</u>
Total.....		
Construction work in process:		
Gross expenditures for construction of projects to date.....	5, 961, 227. 64	
Less revenues earned during construction as follows:		
Rentals of buildings.....	\$10, 255. 06	
Rentals of grazing lands.....	15, 503. 60	
Rentals of lodgings.....	7, 410. 55	
Contractors' freight refunds.....	412. 07	
Forfeitures by defaulting bidders and contractors.....	499. 95	
Profits on mess houses.....	17, 812. 12	
Profits on mercantile store.....	18, 256. 51	
Loss on hospitals.....	<sup>1</sup> 363. 13	
Adjustments—Depreciation on plant and equipment.....	135, 505. 96	
		<u>205, 292. 69</u>
Total deductions.....		
Net expenditures for construction of project to date.....		5, 755, 934. 95
Deferred operation and maintenance charges.....		<u>148, 532. 46</u>
Total assets.....		<u><u>6, 671, 267. 63</u></u>

**LIABILITIES, RESERVES, AND CAPITAL.**

Accounts payable:		
Unpaid progress earnings under construction contracts.....	\$6, 680. 85	
Unpaid labor.....	7, 120. 59	
Unpaid purchases.....	3, 955. 13	
Unpaid freight and express.....	7, 927. 78	
Unpaid passenger fares.....	215. 81	
Unpaid agreements to purchase real estate.....	115. 00	
Unredeemed coupon books.....	119. 85	
Unredeemed meal tickets.....	142. 25	
Unpaid cooperative certificates.....	27. 00	
		<u>26, 304. 26</u>
Total.....		

<sup>1</sup> Deduct.

**Reserves for repayment to reclamation fund of cost of project:**

Value of construction contracts with water-right applicants.....	\$862, 799. 13
Value of construction contracts with water-right applicants temporarily suspended.....	2, 640. 00
Construction charges paid in advance by water-right applicants.....	4, 073. 58
Construction charges paid and forfeited by water-right applicants.....	974. 60
Penalties on construction charges paid by water-right applicants.....	40. 84
<b>Total.....</b>	<b>\$870, 528. 15</b>
<b>Net investment:</b>	
Disbursements.....	\$6, 076, 958. 74
Transfers received from other projects.....	276, 365. 74
	<u>6, 353, 324. 48</u>
<b>Less—</b>	
Collections.....	530, 154. 94
Transfers issued to other projects.....	48, 734. 32
	<u>578, 889. 26</u>
<b>Total.....</b>	<b>5, 774, 435. 22</b>
<b>Total liabilities, reserves, and capital investment of the Government.....</b>	<b>6, 671, 267. 63</b>

*Functional feature costs of Truckee-Carson project to June 30, 1915.*

Examination and surveys.....	\$218, 488. 84
Storage system.....	1, 664, 859. 50
Canal system.....	2, 236, 318. 37
Lateral system.....	1, 127, 925. 01
Drainage system.....	287, 724. 08
Flood protection.....	131, 821. 37
Power system.....	137, 458. 08
Farm units.....	15, 509. 80
Permanent improvements and land.....	96, 372. 21
Telephone system.....	42, 176. 37
Unpaid operation and maintenance charges compounded with construction charges.....	2, 022. 93
Stores and other operations.....	551. 10
	<u>5, 961, 227. 64</u>

*Operating revenue and expenses, Truckee-Carson project, to June 30, 1915.***EXPENSES.**

<b>Storage system:</b>	
Operation.....	\$24, 122. 00
Maintenance.....	12, 311. 32
<b>Canal system:</b>	
Operation.....	5, 509. 91
Maintenance.....	16, 218. 32
<b>Lateral system:</b>	
Operation.....	116, 432. 07
Maintenance.....	149, 992. 82
<b>Drainage and flood protection system:</b>	
Operation.....	934. 83
Maintenance.....	38, 506. 62
Accrued and unpaid operation and maintenance charges added to construction.....	<sup>1</sup> 2, 022. 93
<b>Total.....</b>	<b>362, 004. 96</b>

<sup>1</sup> Deduct.

## REVENUES.

Operation and maintenance water-right charges accrued on contracts with water-right applicants.....	\$172,853.33
Operation and maintenance water-right charges paid in advance.....	.40
Operation and maintenance water-right charges forfeited.....	1,150.27
Penalties on operation and maintenance water-right charges.....	66.97
Rentals of buildings.....	482.27
Rentals of power and light.....	14,343.69
Rentals of irrigation water.....	4,935.84
Forfeitures by defaulting bidders and contractors.....	10,000.00
Revenues, miscellaneous.....	678.56
Advanced payments, rentals of water.....	21.54
Power system depreciation.....	8,939.63
Deferred operation and maintenance revenues (carried to debit side of assets and liabilities statement).....	148,532.46
<b>Total.....</b>	<b>362,004.96</b>

*Estimated cost of contemplated works, Truckee-Carson project, during fiscal year 1916.*

Examination and surveys.....	\$7,400.00
Storage system:	
Lake Tahoe control—Channel improvement.....	\$3,500.00
Lahontan Dam—Demolition of camp buildings and disposal of plant and supplies.....	3,500.00
	<hr/> 7,000.00
Lateral system:	
Preliminary and general work.....	2,000.00
Laterals and sublaterals.....	33,500.00
Plant and equipment.....	5,000.00
	<hr/> 40,500.00
Farm units—Preliminary and general work.....	6,400.00
Permanent improvements and land:	
Buildings.....	4,000.00
Real estate and permanent improvements.....	700.00
	<hr/> 4,700.00
Operation and maintenance under public notice.....	57,200.00
Stores and other operations (reimbursable accounts).....	8,500.00
Unallotted to features.....	58,300.00
<b>Total.....</b>	<b>190,000.00</b>

## **NEW MEXICO, CARLSBAD PROJECT.**

L. E. FOSTER, project manager, Carlsbad, N. Mex.

### **LOCATION.**

County: Eddy.

Townships: 18 to 24 S., Rs. 25 to 29 E., New Mexico meridian.

Railroad: Atchison, Topeka & Santa Fe System.

Railroad stations and estimated population January 1, 1915: Carlsbad, 2,750; Otis, 25; Loving, 150; and Malaga, 75.

### **WATER SUPPLY.**

Source of water supply: Pecos River.

Area of drainage basin: 22,000 square miles.

Annual run-off in acre-feet of Pecos River at Carlsbad and Dayton (22,000 square miles), 1899 to 1914: Maximum, 912,000; minimum, 148,000; mean, 304,000.

### **AGRICULTURAL AND CLIMATIC CONDITIONS.**

Area for which the service is prepared to supply water, season of 1915: 24,796 acres

Area under water-right applications, season of 1915: 20,468 acres.

Length of irrigating season: From March to November and two weeks in winter, 260 days.

Average elevation of irrigable area: 3,100 feet above sea level.

Average annual rainfall on irrigable area: 1902-1914, 15 inches; calendar year 1914, 19.04 inches. Relatively wet year.

Range of temperature on irrigable area:  $-5^{\circ}$  to  $110^{\circ}$  F.

Character of soil of irrigable area: Pecos—Sandy loam with large lime content.

Principal products: Alfalfa, cotton, grain crops, grapes, melons, peaches, pears, and miscellaneous fruits.

Principal markets: Carlsbad, N. Mex.; Denver, Colo.; Chicago, Ill.; Kansas City, Mo.; Texas cities; New York, N. Y.

### **LANDS OPENED FOR IRRIGATION.**

Dates of public notices: December 17, 1907; November 30, 1908; June 2, 1909; November 17, 1909; October 7, 1910; March 13, 1911; February 17, 1912; March 2 and April 10, 1915.

Location of lands opened: Ts. 21, 22, 23, and 24 S., Rs. 26, 27, 28, and 29 E., New Mexico meridian.

Irrigable lands opened: 24,796 acres; State lands, 923 acres; private, 23,873 acres.

Limit of area of farm units: 160 acres for 20,261 acres; 40 acres for 4,535 acres.

Duty of water: 3 acre-feet per acre per annum at the farm.

Building charge per acre of irrigable land: \$31, \$45, and \$60 (public notice for lands at \$55 not yet issued).

Annual operation and maintenance charge: Graduated scale according to use: First acre-foot, 75 cents; second acre-foot, 30 cents; third acre-foot, 40 cents; fourth acre-foot, 50 cents; fifth acre-foot, 60 cents; additional acre-feet, 75 cents per acre-foot.

### **CHRONOLOGICAL SUMMARY.**

Reconnaissance made and preliminary surveys begun in 1904.

Construction recommended by board of engineers, August 31, 1905.

Construction authorized by Secretary, February 24, 1906.

Canal system of Pecos Irrigation Co. purchased February, 1906.

First irrigation by Reclamation Service, season of 1907.

Project completed, 1912.



**IRRIGATION PLAN.**

The irrigation plan of the Carlsbad project provides for the storage of water in Lake McMillan, on Pecos River, near Lakewood, N. Mex., and in a storage and distributing reservoir on the same river near Carlsbad, N. Mex., controlled by Avalon Dam, and the diversion of water from Avalon Reservoir into a canal system, watering lands on both sides of Pecos River in the vicinity of Carlsbad. The United States claims all waste, seepage, spring, and percolating water arising within the project, and proposes to use such water in connection therewith.

The construction of the project was completed in 1912, and the principal features are: The Avalon and McMillan earth and rock fill dams, the former having a concrete core wall; a concrete flume or aqueduct spanning the Pecos River, with 4 arches of 100 feet each; a reinforced concrete siphon 6 feet in diameter and 400 feet long, under Dark Canyon; about 50 miles of canals and laterals (exclusive of sublaterals and ditches); a concrete head-gate structure at each of the dams and 2 tunnels driven through rock, each 21 feet in diameter, lined with concrete, aggregating 200 feet in length, equipped with heavy cylindrical gates, operated by turbines (replacing concrete spillway, equipped with wooden emergency gates; spillway having been closed with concrete). All check-gate, spillway, and head-gate structures on the canals, and all turnouts on the laterals, are of concrete construction.

**CONSTRUCTION DURING FISCAL YEAR.**

The principal construction during the fiscal year consisted of lining about  $5\frac{1}{4}$  miles of the main canal through the gypsum area, between laterals 16 and 20 and laterals 22 and 24. Concrete farm turnouts and weirs were built as required. A subdivision survey was also completed on the west side of Lake McMillan, and a silt survey of the lake was commenced, the field work being completed before July 1.

**DRAINAGE.**

No drainage construction was done during the fiscal year. Locations for two open outlets, aggregating about 3 miles in length, and one closed drain about  $1\frac{1}{4}$  miles long, were made. Investigations and water-table observations were made on three separate areas of the project. A steady rise of ground water in the Loving area has been observed.

**OPERATION AND MAINTENANCE.**

There has been an ample supply of water for irrigation of the entire project during the year, the amount of water wasted having been large. The area actually irrigated to June 30, 1915, amounted to 13,229 acres. The area irrigated during the season 1914 amounted to 12,740 acres.

A large flood occurred on the Pecos River watershed during April, 1915, which ruined spillway No. 3 and seriously damaged the east embankment at Lake McMillan. Considerable damage was done to the main canal and to the Dark Canyon syphon by the high water in Dark Canyon. The damage to the canal and syphon was temporarily repaired at once and no crop damage resulted from the flood.

*Historical review, Carlsbad project.*

Item.	1910	1911	1912	1913	1914	1915 <sup>1</sup>
Acres for which service was prepared to supply water.	20,267	20,267	20,277	20,261	20,261	24,796
Acres irrigated.....	13,203	14,853	13,509	14,260	12,740	13,229
Miles of canal operated.....	45	45	45	45	45	45
Water diverted (acre-feet).....	93,351	85,100	85,086	86,560	87,900	85,000
Water delivered to land (acre-feet).....	31,561	33,198	38,764	33,044	30,900	30,000
Per acre of land irrigated (acre-feet).....	2.4	2.2	2.9	2.3	2.4	2.3

<sup>1</sup> Estimated.

**SETTLEMENT.**

The two cooperative organizations on the project (the Otis Creamery and the Otis Union) were active during the year. While the output of butter at the creamery has not increased materially, a good quality was produced and found a ready local market.

Several thousand acres of land have been sold during the year, but this has not resulted in materially increasing the population on the farms. Considerable substantial improvements have been made on some of the farms, however. Some large tracts have been sold recently and there is considerable activity on the part of new settlers in the preparation of new land for winter grain crops.

*Settlement data, Carlsbad project.*

Item.	1912	1913	1914	1915
Total number of farms on project.....	<sup>1</sup> 521	519	524	616
Population of.....	675	940	950	950
Number of irrigated farms.....	345	362	362	390
Operated by owners or managers.....	145	224	240	280
Operated by tenants.....	<sup>2</sup> 200	138	122	110
Population of.....	650	910	925	541
Number of towns.....	4	4	4	4
Population of.....	3,000	3,100	3,200	3,000
Total population in towns and on farms.....	3,675	4,040	4,150	3,950
Number of public schools.....	7	7	7	7
Number of churches.....	8	8	8	8
Number of banks.....	2	2	2	2
Total capital stock.....	\$30,000	\$30,000	\$30,000	\$30,000
Total amount of deposits.....			\$547,000	\$637,000
Total number of depositors.....			1,400	1,484

<sup>1</sup> Water-right applicants.

<sup>2</sup> In 1912 many farms were operated by 1 man. The 200 farms were actually operated by 28 tenants.

**PRINCIPAL CROPS.**

During the season of 1914 the total area in crops amounted to 12,690 acres, and approximately 50 acres were irrigated by the town of Carlsbad, making the total acreage irrigated 12,740 acres. A large cotton crop was grown, but the price was low. The price of alfalfa hay was unusually low also, but the average yield per acre was about 1 ton more than in former years. The total area irrigated during the season was 1,520 acres less than in 1913, but the average gross value of crops per acre exceeded that of 1913 by \$1.05. The total area in crops up to midsummer of 1915 amounted to 13,229 acres. The prospects are that this total will be increased by the planting of grain during the fall. The cotton acreage is small, but the crop looks remarkably good. The acreage in Indian corn and the sorghum head corns is large and the crops are in a thrifty condition. The early crop of alfalfa was good, but subsequent crops have been seriously damaged in some parts of the project by grasshoppers. Very little damage has occurred as a result of rain.

*Crop report, Carlsbad project, New Mexico, year of 1914.*

Irrigated crop.	Area acres.	Unit of yield.	Yields.		Values.		
			Total	Average per acre.	Per unit of yield.	Total.	Per acre.
Alfalfa hay .....	7,637	Tons .....	19,420	2.5	\$8.55	\$165,950	\$21.73
Alfalfa seed .....	275	Pounds .....	18,525	67	.09	1,684	6.12
Barley .....	5	Bushels .....	125	25	.46	57	11.40
Beets, sugar .....	5	Tons .....	35	7	5.00	175	35.00
Cane .....	208	do .....	657	3	7.48	4,904	23.58
Corn, Indian .....	496	Bushels .....	12,410	25	1.00	12,410	25.02
Corn, sorghum .....	559	do .....	13,850	25	1.00	13,920	24.90
Cotton .....	1,303	Pounds .....	359,459	276	.075	27,001	20.72
Cotton, seed .....	1,303	Tons .....	360	.3	12.00	4,320	3.32
Garden .....	29	do .....				1,461	50.40
Melons .....	1	do .....				70	70.00
Oat, hay .....	49	Tons .....	31	.6	9.84	305	6.22
Onions .....	2	Pounds .....	26,000	13,000	.02	562	281.00
Pasture .....	374	do .....				3,206	8.57
Peaches .....	57	Pounds .....	20,000	351	.04	800	14.04
Potatoes, sweet .....	4	Bushels .....	800	200	1.00	800	200.00
Wheat .....	2	do .....	30	15	1.27	38	19.00
Less duplicated areas .....	1,578						
Total cropped acreage .....	10,731		Total and average .....			237,663	22.15
Irrigated, not cropped:							
Alfalfa, new .....	940						
Orchard .....	238						
Miscellaneous .....	781						
Grand total irrigated .....	12,690						

Areas.	Acres.	No. farms.	Per cent of project.
Total irrigable area farms reported .....	15,712	390	78
Total irrigated area farms reported under water-right applications .....	12,690	390	63
Total cropped area farms reported .....	10,731	390	53

**PUBLIC NOTICE DATED MARCH 2, 1915.**

1. Under the terms of existing public notices and orders, the operation and maintenance charges for the irrigation season of 1914 for the Carlsbad project, New Mexico, became due December 1, 1914.

2. In pursuance of the provisions of the reclamation act of June 17, 1902 (32 Stat., 388), and acts amendatory thereof and supplemental thereto, and in particular the reclamation extension act of August 13, 1914 (38 Stat., 686), section 6 of which authorizes the Secretary of the Interior to fix the due date for operation and maintenance charges, notice is hereby given that the operation and maintenance charge for the said project, which under existing public notice became due December 1, 1914, is postponed to and shall become due on March 1, 1915, and all operation and maintenance charges hereafter made against lands under the said project shall become due on March 1 of each year thereafter until further notice.

3. Hereafter no operation and maintenance charge shall be collected at the time water-right application is filed, but the first payment on account of operation and maintenance shall become due on March 1 of the year following the calendar year in which same was made. If original homestead entry or original water-right application be filed after June 15 in any year the first payment on account

of operation and maintenance will not become due until March 1 of the second calendar year following the date of entry.

4. For the operation and maintenance charge due March 1, 1915, no discount will be allowed for payment prior to such date, but penalties as prescribed by the extension act will attach. As to the operation and maintenance charges due March 1, 1916, and thereafter, the discount for payment made on or before the due date and the penalties for failure to make payment before the 1st day of the third calendar month after the due date will be applied as provided in section 6 of the said reclamation extension act. The discounts and penalties herein provided for attach for all lands, whether acceptances of the extension act have been filed or not.

5. The operation and maintenance charges for the irrigation season of 1915 shall be due March 1, 1916, and each acre of irrigable land, whether irrigated or not, shall be charged with a minimum operation and maintenance charge of 75 cents, which will permit delivery of not more than 1 acre-foot per acre; for the first acre-foot additional the charge shall be 30 cents per acre-foot, 40 cents for the second, 50 cents for the third, and 60 cents for the fourth. Should further quantities be needed, they will be furnished at the rate of 75 cents per acre-foot.

6. The provisions of this public notice shall apply to all lands subject to public notice heretofore issued for the said project.

7. Except as hereinabove provided all the terms and provisions of existing public notices and orders for the said project shall remain unchanged.

A. A. JONES,  
*First Assistant Secretary.*

**PUBLIC NOTICE DATED APRIL 10, 1915.**

1. In pursuance of the provisions of section 4 of the reclamation act of June 17, 1902 (32 Stat., 388), and acts amendatory thereof and supplemental thereto, and particularly the reclamation extension act of August 13, 1914 (38 Stat., 686), notice is hereby given that water will be furnished from the Carlsbad project, New Mexico, in the irrigation season of 1915, and thereafter upon the filing of proper water-right application, for the irrigable lands in the second unit shown on the following farm-unit plats, viz: New Mexico principal meridian—T. 21 S., R. 26 E.; T. 22 S., R. 26 E.; T. 21 S., R. 27 E.; T. 22 S., R. 27 E.; T. 23 S., R. 27 E.; T. 22 S., R. 28 E.; T. 23 S., R. 28 E.; T. 24 S., R. 28 E.; T. 23 S., R. 29 E.; T. 24 S., R. 29 E., approved February 16, 1915, by the Secretary of the Interior and on file in the office of the project manager, United States Reclamation Service, Carlsbad, N. Mex., and the local land office at Roswell, N. Mex.

2. The provisions of this public notice apply only to the irrigable areas shown within a square in each private land subdivision, this symbol being used to distinguish the second unit lands, opened to irrigation in 1915, from those subject to previous public notices.

3. Water-right applications for the lands in private ownership may be made to the project manager, United States Reclamation Service, Carlsbad, N. Mex., on and after the date of this notice. The limit of area for which water-right application may be made hereunder shall

be 40 acres of irrigable land for each landowner, and no application will be accepted from any landowner whose irrigable area, shown on these plats, plus any other land of the applicant irrigable from the said project, shall exceed 40 acres of irrigable land, unless payment in full of the construction charge has been made for such other irrigable lands.

4. The water-right charges for said lands shall be of two kinds: (a) A charge of \$60 per irrigable acre for the building of the irrigation system, termed the construction charge, the installments being due and payable as herein provided; and (b) an annual charge for operation and maintenance due and payable March 1 of each year for the preceding irrigation season. The operation and maintenance charge for the irrigation season of 1915 shall be due on March 1, 1916, and the amount thereof shall be the same as announced for other lands under the Carlsbad project.

5. For all of said lands which were, before August 13, 1914, subject to the terms and conditions of the reclamation law and for which acceptances or water-right applications under the terms of the reclamation extension act shall be duly filed within six months from the date hereof, the same being by means of a water-right application of the form provided for use under said reclamation extension act, the first installment of the construction charge shall be due on December 1, 1915, and subsequent installments on December 1 of each year thereafter. The first four of such installments shall each be 2 per cent, the next two each 4 per cent, and the next 14 each 6 per cent of the construction charge.

6. For any landholder described in paragraph 5 who elects not to file acceptance by means of application under the reclamation extension act within the time limited by law, the first installment shall be due December 1, 1915, and the same shall consist of one-tenth of the construction charge, namely, \$6 per irrigable acre, and payment shall be made on account of operation and maintenance, as provided in paragraph 4 hereof. Additional installments, each one-tenth of the construction charge, shall be due on December 1 of each year thereafter for nine years. Persons coming under the terms of this paragraph shall file water-right application on the form in use prior to the passage of the act of August 13, 1914.

7. For all lands which were not, prior to August 13, 1914, subject to the terms and conditions of the reclamation law, a payment of \$3 per irrigable acre on account of the construction charge, called the initial payment, must be made at the time of making water-right application, which shall be on the form provided for in paragraph 5. The remainder of the construction charge, to wit, \$57 per irrigable acre, must be paid in 15 annual installments, the first five of which shall be \$3 each and the remaining installments \$4.20 each per irrigable acre. The first annual installment becomes due December 1 of the fifth calendar year after the year in which the initial payment is due. The subsequent annual installments become due on December 1 of each year thereafter.

8. In all cases where water-right application for lands in private ownership, or for lands under entries not subject to said reclamation act, shall not be made within one year from date of this notice, the

construction charge for such land shall be increased 5 per cent each year until water-right application and an initial payment are made.

9. The lands hereby opened to irrigation shall be subject, so far as applicable and not in conflict herewith, to the public notices and orders heretofore issued for lands under the Carlsbad project.

10. Any water-right applicant may pay the whole or any part of the construction charge within a shorter period.

11. The method of determining the annual operation and maintenance charge, and the penalties for failure to pay the construction charge and the operation and maintenance charges when due, and discount allowed for prepayment of operation and maintenance charges are prescribed by the act of August 13, 1914, for lands subject to that act; and for other lands such information will be duly announced.

A. A. JONES,  
*First Assistant Secretary.*

### FINANCIAL STATEMENTS.

*Assets, liabilities, reserves, and capital, Carlsbad project, to June 30, 1915.*

#### ASSETS.

##### Accounts receivable:

Construction charges due and uncollected from water-right applicants.....	\$11,896.01	
Construction charges unaccrued on contracts with water-right applicants.....	795,756.75	
Operation and maintenance charges due and uncollected from water-right applicants.....	10,390.00	
Uncollected miscellaneous items.....	148.06	
<b>Total.....</b>		<b>\$818,190.82</b>

##### Inventories:

Mechanical and other equipment.....	19,037.13	
Materials and supplies on hand in storehouses.....	5,983.16	
		<b>25,020.29</b>

Gross expenditures for construction of project to date..... 985,832.84

##### Less revenues earned during construction as follows:

Rentals of buildings.....	\$578.00
Rentals of irrigation water.....	8,163.35
Miscellaneous revenues.....	2,227.31
Profits on mess houses.....	19
Profits on hospital.....	1,537.41

##### Adjustments:

Depreciation on plant and equipment.....	66.00
--	-------

**Total deductions..... 12,572.26**

Net expenditure for construction of project to date..... 973,260.58

Deferred operation and maintenance charges..... 8,394.92

**Total assets..... 1,824,866.61**

#### LIABILITIES, RESERVES, AND CAPITAL.

##### Accounts payable:

Unpaid labor.....	\$2,762.92
Unpaid purchases.....	7,178.19
Unpaid freight and express.....	4,159.58
Unpaid passenger fares.....	179.60
Unpaid agreements to purchase real estate.....	150.00
Unpaid miscellaneous.....	440.40

**Total..... 14,870.69**

## Reserves for repayment to reclamation fund of cost of project:

Value of construction contracts with water-right applicants.....	\$900,678.00	
Value of construction contracts with water-right applicants temporarily suspended.....	23,085.00	
Construction water-right charges paid in advance by water-right applicants.....	3,113.37	
Construction water-right charges paid and forfeited by water-right applicants.....	108.50	
Penalties on construction charges paid by water-right applicants.....	111.68	
<b>Total.....</b>		<b>\$927,096.55</b>
Net investment:		
Disbursements.....	\$1,129,437.55	
Transfers received from other projects.....	33,519.31	
	<b>1,162,956.86</b>	
Less—		
Collections.....	266,477.57	
Transfers issued to other projects.....	13,579.92	
	<b>280,057.49</b>	
<b>Total.....</b>		<b>882,899.37</b>
<b>Total liabilities, reserves, and capital investment of the Government.....</b>		<b>1,824,866.61</b>

*Functional feature cost of Carlsbad project to June 30, 1915.*

Storage system.....	\$410,342.55
Canal system.....	294,185.55
Lateral system.....	44,162.19
Drainage system.....	33,563.55
Farm units.....	44,227.89
Permanent structures and land.....	155,247.15
Stores and other operations.....	2,169.96
Operation and maintenance charges compounded with construction charges.....	1,934.00
<b>Gross expenditures for construction of project to date.....</b>	<b>985,832.84</b>

*Operating revenues and expense, Carlsbad project, to June 30, 1915.*

## EXPENSES.

Storage system:	
Operation.....	\$4,913.30
Maintenance.....	7,018.90
Canal system:	
Operation.....	20,815.90
Maintenance.....	29,737.15
Lateral system:	
Operation.....	29,649.78
Maintenance.....	43,079.12
Drainage and flood protection:	
Operation.....	548.80
Maintenance.....	784.21
Undistributed expenses:	
Operation.....	7,301.00
Maintenance.....	10,429.47
<b>Total.....</b>	<b>154,277.63</b>
Less operation and maintenance charges delinquent added to construction charges.....	1,934.00
	<b>152,343.63</b>

## REVENUES.

Operation and maintenance water-right charges accrued on contracts with water-right applicants.....	\$133,873.95	
Operation and maintenance water-right charges advanced..	764.57	
Operation and maintenance water-right charges forfeited...	85.95	
Penalties on operation and maintenance water-right charges.	4.86	
Rentals of buildings.....	2,395.44	
Rentals of grazing and farming lands.....	128.00	
Rentals of irrigation water.....	4,828.86	
Revenues, miscellaneous.....	1,869.08	
Deferred operation and maintenance revenues (carried to debit side of assets and liabilities statement).....	8,394.92	
		<u>\$152,343.63</u>

*Estimated cost of contemplated works, Carlsbad project, during fiscal year 1916.*

Examination and surveys.....	\$4,000.00	
Storage system.....	8,660.00	
Canal system.....	13,690.00	
Lateral system:		
New laterals, concrete lining, and structures.....	\$9,600.00	
Flume.....	4,650.00	
Siphon.....	5,500.00	
		<u>19,750.00</u>
Drainage system:		
Open drains.....	11,800.00	
Closed drains.....	18,500.00	
		<u>30,300.00</u>
Operation and maintenance—Public notice.....	25,000.00	
Stores and other operations (reimbursable accounts).....	1,000.00	
		<u>102,400.00</u>
Total.....		
8004°—15—14		



## **NEW MEXICO, HONDO PROJECT.**

L. E. FOSTER, project manager, Carlsbad, N. Mex.

### **LOCATION.**

County: Chaves.

Townships: 11 and 12 S., Rs. 22, 23, and 24 E., New Mexico meridian.

Railroad: Atchison, Topeka & Santa Fe Ry.

Railroad station and estimated population, January 1, 1915, Roswell, N. Mex., 7,000.

### **WATER SUPPLY.**

Source of water supply: Hondo River.

Area of drainage basin: 1,037 square miles.

Annual run-off in acre-feet of Hondo River at the diversion dam (1,037 square miles), 1903 to 1914: Maximum, 90,500; minimum, 2,100; mean, 29,000.

### **AGRICULTURAL AND CLIMATIC CONDITIONS.**

Area for which the service was prepared to supply water season of 1915: 1,200 acres.

Area under rental contracts season of 1915: 1,605 acres.

Length of irrigating season: From March to November—245 days.

Average elevation of irrigable area: 3,750 feet above sea level.

Average annual rainfall on irrigable area: 19 years, 14.4 inches; 1914, 13.31 inches.

Range of temperature on irrigable area: 0° to 100° F.

Character of soil of irrigable area: Rich alluvium.

Principal products: Alfalfa and fruits.

Principal markets: Roswell, N. Mex.; Kansas City, Mo.; Chicago, Ill.; and Texas cities.

### **LANDS OPENED FOR IRRIGATION.**

No lands have been opened for irrigation by public notice; 1,224 acres were irrigated under rental contracts to December 31, 1914.

### **CHRONOLOGICAL SUMMARY.**

Reconnaissance and preliminary surveys begun in 1903.

Construction recommended by board of engineers June 6, 1904.

Construction authorized by Secretary September 6, 1904.

Hondo Reservoir site purchased December 3, 1904.

Hondo Reservoir and inlet canal completed August, 1906.

Distributing canals completed April, 1907.

Project completed May, 1907.

### **IRRIGATION PLAN.**

The irrigation plan of the Hondo project provides for the diversion of water from the Hondo River about 12 miles southwest of Roswell, N. Mex., through a short inlet canal, into a natural storage reservoir, the capacity of which is increased by embankments; the return of stored water to the river, and the diversion of water from the river by three dams, 2, 4, and 6 miles, respectively, below the reservoir, into canal systems watering lands in the vicinity of Roswell, N. Mex. The United States claims all waste, seepage, spring, and percolating water arising within the project and proposes to use such water in connection therewith.

All features of this project are completed, and no construction work was in progress during the fiscal year.

**CONSTRUCTION DURING FISCAL YEAR.**

There has been no construction work during the year.

**OPERATION AND MAINTENANCE.**

The available flow of water from the Hondo River was diverted directly into the canal system, irrigating 1,224 acres under water-rental contracts to December 31, 1914. The canal and lateral systems have been cleaned of silt and weeds as required, and this has constituted the principal maintenance work.

*Historical review, Hondo project.*

Item.	1910	1911	1912	1913	1914	1915
Acreage for which service was prepared to supply water.....		1,100	1,200	1,000	1,200	1,200
Acreage irrigated.....		1,136	1,261	932	1,224	
Miles of canal operated.....	12½	12½	12½	12½	12½	12½
Water diverted (acre-feet).....	4,225	21,020	13,062	2,188	3,178	
Water delivered to land (acre-feet).....	1,170	1,049	1,640	800	1,108	
Per acre of land irrigated (acre-feet).....	.9	.9	1.3	.86	.91	

**SETTLEMENT.**

There has been practically no settlement during the fiscal year 1915. A few tracts of land changed hands during the year with no appreciable change in population.

*Settlement data, Hondo project.*

Item.	1912	1913	1914
Total number of farms in project.....	26	22	25
Population.....	85	77	90
Number of irrigated farms.....	23	22	25
Operated by owners or managers.....	16	12	14
Operated by tenants.....	7	15	16
Population of.....	70	77	90
Number of towns.....	1	1	1
Population of.....	7,000	7,000	7,000
Total population in towns and on farms.....	7,085	7,077	7,090
Number of public schools.....	3	3	3
Number of churches.....	9	9	9
Number of banks.....	4	4	4
Total capital stock.....			\$350,000.00
Total amount of deposits.....			\$2,553,425.16

<sup>1</sup> Five farms not occupied.

**PRINCIPAL CROPS.**

The principal crops raised on the Hondo project are alfalfa, sorghum, apples, and peaches. The area cropped during the calendar year 1914 amounted to 1,172 acres, producing crops valued at \$21,458, or at the rate of \$18.31 per acre. This was an increase over the year 1913 of 364 acres cropped, \$7,222 in total value, and 69 cents per acre of yield. This increase is due principally to the growth of a large crop of the various sorghums.

*Crop report, Hondo project, New Mexico, year of 1914.*

Irrigated crop.	Area acres.	Unit of yield.	Yields.		Values.		
			Total.	Average per acre.	Per unit of yield.	Total.	Per acre.
Alfalfa.....	668	Tons....	1,492	2.2	\$8.26	\$12,287	\$18.39
Apples.....	57	Pounds..	112,000	1,965	.006	620	10.88
Cane (head corn).....	36	Tons....	80	2.2	7.75	620	17.22
Corn, sorghum.....	357	do.....	458	1.3	12.30	5,635	15.76
Corn, fodder.....	233	do.....	222	.96	6.29	1,397	6.00
Corn, Indian.....	21	Bushels..	495	24.1	.75	369	18.00
Millet hay.....	6	Tons....	18	3.0	10.00	180	30.00
Miscellaneous fruit.....	7	Pounds..	3,500	500	.04	150	21.43
Pasture.....	20					200	10.00
Less duplicated areas.....	233						
Total cropped acreage..	1,172	Total and average.....				21,468	18.31
Irrigated, not cropped, miscellaneous.....	62						
Grand total irrigated...	1,234						

Areas.	Acres.	Number of farms.	Per cent of project.
Total irrigable area farms reported.....	3,025	25	30
Total irrigated area farms reported.....	1,224	25	12
Under rental contracts.....	1,224	25	12
Total cropped area farms reported.....	1,172	25	12

**FINANCIAL STATEMENTS.***Assets, liabilities, reserves, and capital, Hondo project, to June 30, 1915.***ASSETS.**

Accounts receivable, uncollected rentals of irrigation water.....	\$29.41
Inventories:	
Materials and supplies on hand in storehouses.....	\$19.35
Unadjusted transfers between projects.....	85.25
Total.....	104.60
Construction work in process:	
Gross expenditures for construction of project to date....	374,619.50
Less revenue earned during construction as follows:	
Rentals of buildings.....	\$100.00
Rentals of irrigation water.....	7,238.85
Contractors' freight refunds.....	159.63
Miscellaneous revenues.....	31.06
Loss on hospital.....	<sup>1</sup> 103.75
Adjustments—	
Depreciation on plant and equipment....	23.60
Total deductions.....	7,449.39
Net expenditures for construction of project to date.....	367,170.11
Total assets.....	367,304.12

<sup>1</sup> Deduct.

## LIABILITIES, RESERVES, AND CAPITAL.

Accounts payable:	
Unpaid purchases.....	\$11. 00
Unpaid freight and express.....	1. 51
Unpaid passenger fares.....	34. 50
Total.....	\$47. 01
Net investment:	
Disbursements.....	\$387, 018. 53
Transfers received from other projects.....	13, 829. 69
	400, 848. 22
Less—	
Collections.....	32, 799. 59
Transfers issued to other projects.....	791. 52
	33, 591. 11
Total.....	367, 257. 11
Total liabilities, reserves, and capital investment of the Government.....	367, 304. 12

*Functional feature costs of Hondo project to June 30, 1915.*

Storage system.....	\$154, 844. 67
Canal system.....	98, 321. 39
Lateral system.....	38, 979. 34
Farm units.....	19, 837. 41
Permanent structures and land.....	23, 338. 45
Telephone system.....	4, 170. 42
Operation and maintenance during construction.....	34, 785. 82
Stores and other operations.....	342. 00
Gross expenditures for construction of project to date.....	374, 619. 50

*Estimated cost of contemplated work, Hondo project, during fiscal year 1916.*

Operation and maintenance during construction.....	\$3, 800. 00
Stores and other operations (reimbursable accounts).....	200. 00
Total.....	4, 000. 00

## **NEW MEXICO-TEXAS, RIO GRANDE PROJECT.**

R. F. WALTER, project manager, El Paso, Tex.

### **LOCATION.**

Counties: Socorro, Sierra, Dona Ana, N. Mex.; El Paso, Tex.  
Townships: 8 to 29 S., Rs. 3 E. to 5 W., New Mexico meridian.  
Railroads: Atchison, Topeka & Santa Fe, El Paso & Southwestern, Southern Pacific, and Texas & Pacific.

### **WATER SUPPLY.**

Source of water supply: Rio Grande.  
Area of drainage basin: 37,000 square miles.  
Annual run-off in acre-feet of Rio Grande: At San Marcial (30,000 square miles), 1895 to 1914, inclusive, maximum, 2,422,000; minimum, 200,700; mean, 1,129,400. At El Paso, Tex. (33,600 square miles), 1889 to 1914, inclusive, maximum, 2,010,000; minimum, 50,700; mean, 925,400.

### **AGRICULTURAL AND CLIMATIC CONDITIONS.**

Area for which the service is prepared to supply water, season of 1915: 47,160 acres.  
Area under rental contracts, season of 1915: 47,160 acres.  
Length of irrigating season: From February 15 to November 15—274 days.  
Average elevation of irrigable area: 3,700 feet above sea level.  
Average annual rainfall on irrigable area: 30-year average, 10.07 inches; 1914, 17.02 inches.  
Range of temperature on irrigable area: 0° to 100° F.  
Character of soil of irrigable area: Fertile alluvium and sandy loam.  
Principal products: Alfalfa, corn, wheat, melons, fruit, and vegetables.  
Principal markets: Towns in Texas, New Mexico, Louisiana, and eastern cities.

### **LANDS OPENED FOR IRRIGATION.**

No lands have been opened for irrigation by public notice.  
All lands of Leasburg unit and in El Paso Valley are being irrigated under rental contracts.

### **CHRONOLOGICAL SUMMARY.**

Reconnaissance and preliminary surveys begun in March, 1903.  
Construction of Leasburg unit recommended November 29, 1905.  
Construction of Leasburg unit authorized December 2, 1905.  
Reclamation act extended to Texas June 12, 1906 (34 Stat. 259).  
Treaty with Mexico providing for distribution of waters of the Rio Grande proclaimed January 16, 1907.  
Construction of Elephant Butte Dam authorized by Congress and \$1,000,000 appropriated March 4, 1907 (34 Stat., 1357).  
Leasburg unit completed July, 1908.  
First irrigation by Reclamation Service (Leasburg unit), season of 1908.  
Construction of Elephant Butte Dam authorized by Secretary May 23, 1910.  
Construction plans of Elephant Butte Dam approved by board of engineers June 6, 1910, January 22, 1911, August 12, 1912, January 30, 1913.  
Construction plans approved by Secretary October 26, 1910.  
Franklin Canal purchased October, 1912.  
First 11 miles of Franklin Canal reconstructed March, 1914.  
Second section (8 miles) reconstructed 1915.  
Construction work begun on Mesilla Diversion Dam and East and West Side Canals, Mesilla Valley, 1915.  
Elephant Butte Dam 92.7 per cent completed June 30, 1915.  
Project, exclusive of storage, 19.7 per cent completed June 30, 1915.  
Project, including storage, 50 per cent completed June 30, 1915.

**IRRIGATION PLAN.**

The irrigation plan of the Rio Grande project provides for the storage of flood waters of the Rio Grande in a reservoir controlled by Elephant Butte Dam, about 12 miles west of Engle, N. Mex., and the diversion of water from the Rio Grande, about 6 miles below the storage dam, for the irrigation of lands in Las Palomas Valley; about 24 miles below for watering lands in Rincon Valley; about 60 miles below for the irrigation of 28,000 acres in the upper Mesilla Valley under the Leasburg Diversion Dam; about 80 miles below for the irrigation of 57,000 acres in the lower Mesilla Valley under the Mesilla Dam; and about 120 miles below for supplying water to lands in El Paso Valley and furnishing 60,000 acre-feet per annum for use on land in El Paso Valley on the Mexican side of the Rio Grande. The United States claims all waste, seepage, spring, and percolating water arising within the project and proposes to use such water in connection therewith. All the irrigation works required for Las Palomas and Rincon Valleys will be new; those for the Mesilla Valley include a diversion dam and 6½ miles of canal now constructed, as well as a diversion dam to be built 5½ miles southwest of Las Cruces to divert water for the lower end of the Mesilla Valley; and those required for El Paso Valley will supplement and improve present canal systems.

The features of the above irrigation plan that have been constructed are the diversion dam, headworks, and main canal for the 28,000 acres in the upper Mesilla Valley unit, and the reconstruction of a portion of the Franklin Canal in the El Paso Valley. Construction work was begun on the Mesilla Diversion Dam and East and West Side Canals.

**CONSTRUCTION DURING FISCAL YEAR.**

*Elephant Butte Dam.*—Concreting continued throughout the year, three shifts operating until April 1, 1915, and one shift after that time. The mass masonry placed during the year amounted to 313,950 cubic yards. The maximum amount placed during a month was 38,400 cubic yards in January, 1915; the maximum amount during one day, 2,651 cubic yards, January 25, 1915.

All gates and sluiceways, consisting of 16 slide gates and 4 balanced valves, were placed between September 1, 1914, and February 1, 1915.

The embankment, consisting of 165,000 cubic yards of material, was started in December, 1914, and completed June 30, 1915.

Final plans for the spillway, contemplating an arch bridge and four cylinder gates in connection with an ogee crest, were adopted and work was well under way on June 30. The required excavation at that time was approximately 60 per cent complete, including the open cuts for the gate discharges. The concrete placing system had been erected, and the bulk of the forms required had been constructed in the shop.

On April 1 concreting had advanced to such a point that the continuance of four placing crews on concrete was inadvisable. The force was reduced to one crew working one shift, and the number of employees dropped from 1,300 to 370.

Plans for the architectural treatment of the top of the dam have been adopted and detail drawings completed for this feature.

On June 30, 1915, the trash rack and straining tower had been completed to elevation 4,342. The lowest block in the dam was at elevation 4,335, the highest at 4,380, and work was in progress from station 2 + 25 to 11 + 09.

The dam, including spillway, embankment, and all other auxiliary features, was 92.7 per cent completed on June 30, 1915.

*Franklin Canal.*—On the Franklin Canal, El Paso Valley, reconstruction was begun in January on the section between Ysleta and Clint, 76,176 cubic yards of material being moved in enlarging the

section. Several new structures were completed and some old ones repaired. An iron fence was erected along the populated section of canal on Eighth Street in the city of El Paso, as called for by the city ordinance. An important structure called the Ascarate Wasteway was completed during the year. This wasteway is located 6 miles below El Paso and permits the discharge of the entire capacity of the canal to the Rio Grande in case of necessity.

Preparations were begun in December for the construction of the Mesilla Diversion Dam near Las Cruces and the East Side and West Side Canals. Plant was assembled at the dam site and the work well started in February. Considerable difficulty was experienced in holding the cofferdam during the high-water period, on account of the rapid filling of all reservoir capacity at the storage dam. At the end of the fiscal year the floor and piers had been placed on the east side. Work on the East Side and West Side Canals was begun the latter part of December, 1914. The first mile of each canal was excavated by machine, 31,500 cubic yards being excavated by this means on the West Side Canal and 42,600 cubic yards on the East Side Canal. Approximately 450,000 cubic yards of earth were excavated by Government teams on the West Side Canal and 206,600 cubic yards on the East Side Canal. A number of concrete structures were also constructed.

#### SURVEYS.

The survey of farm properties continued and was nearly completed by the end of the fiscal year. These plats show approximately 12,000 separate tracts. Community ditch surveys also were in progress during the year and covered the ditches in the Mesilla and El Paso Valleys. In the Palomas and Rincon Valleys one survey crew located the two diversion dams and main canals, completing the preliminary field work and making possible the working up of final estimates and plans. Under the direction of the drainage engineer several main drains have been located in the Mesilla and El Paso Valleys, using data acquired from test wells bored during a portion of this and the previous year.

#### OPERATION AND MAINTENANCE.

The Leasburg Dam and the Leasburg Main Canal were operated, supplying water to the three principal community ditches in the upper Mesilla Valley. During the calendar year 1914 water was delivered through this system under contract between the United States and the Elephant Butte Water Users' Association.

The Franklin Canal was operated for its full length of 31 miles. Water was delivered through this canal under individual rental contracts, the basis of charge in 1914 being the area irrigated and in 1915 the acre-foot of water used.

During the calendar year 1914 there was irrigated under both systems an area of 28,442 acres. In the Mesilla Valley the amount of water delivered was 6.68 acre-feet per acre, while in the El Paso Valley the amount was 3.67 acre-feet per acre. The average duty of water for the entire project was 5.68 acre-feet per acre.

The season of 1914 was characterized by an excessive amount of rainfall, which was well distributed throughout the growing period. Although no reservoir water was available, good crop yields were made on the irrigated lands of the project.

The season of 1915 has started with excellent growing weather, and at the end of June there was a plentiful supply of reservoir water available, which assures constant irrigation water throughout the season.

*Historical review, Rio Grande project.*

Item.	1910	1911	1912	1913	1914	<sup>1</sup> 1915
Acreage for which the Service was prepared to supply water.....	25,000	26,000	25,000	35,000	40,000	47,160
Acreage irrigated.....	22,600	25,980	23,115	27,723	28,442	32,000
Miles of canal operated.....	6	6	6	37	37	37
Water diverted (acre-feet).....	<sup>2</sup> 99,790	<sup>2</sup> 152,685	<sup>2</sup> 125,000	<sup>2</sup> 149,610	<sup>2</sup> 179,964	<sup>2</sup> 217,800
Water delivered to land (acre-feet).....	<sup>2</sup> 4.4	<sup>2</sup> 6	<sup>2</sup> 5.4	<sup>2</sup> 4.34	<sup>2</sup> 5.68	<sup>2</sup> 5.4

<sup>1</sup> Data for 1915 are estimated.

<sup>2</sup> At lateral headgates. Does not include scouring and silting water, furnished free of charge.

**SETTLEMENT DATA.**

On account of the availability of reservoir water during the season of 1915, a considerable amount of new land has been put in cultivation, especially in the El Paso Valley, under the Franklin Canal. A number of farms have been subdivided into small tracts in the vicinity of El Paso.

The towns of the project have grown steadily during the season. This is especially true of El Paso, where numerous building operations are constantly going on and the population steadily increasing.

*Settlement data, Rio Grande project.*

Items.	1913	1914	1915
Total number of farms on project.....	1,784	1,536	<sup>1</sup> 1,700
Population of farms.....	6,947	6,642	<sup>1</sup> 7,000
Number irrigated farms.....	1,784	1,536	<sup>1</sup> 1,700
Operated by owners.....	1,089	932	<sup>1</sup> 1,000
Operated by tenants.....	695	604	<sup>1</sup> 700
Population of.....	6,947	6,642	<sup>1</sup> 7,000
Number of towns.....	27	25	25
Population of.....	74,918	78,135	<sup>1</sup> 80,000
Total population in towns and farms.....	81,865	84,777	<sup>1</sup> 87,000
Number public schools.....	47	47	<sup>1</sup> 50
Number churches.....	76	81	<sup>1</sup> 85
Number of banks.....	14	14	19
Total amount capital stock.....	\$2,580,000	\$2,645,000	\$3,251,000
Total amount deposits.....	\$10,398,000	\$11,653,000	\$19,916,380
Total number depositors.....	40,000	45,784	48,000

<sup>1</sup> Estimated.

**PRINCIPAL CROPS.**

The crop returns per acre for the season of 1914 were considerably in excess of those for 1913, due probably to the fact that there was no water shortage in 1914. This advantage was somewhat offset, however, by damage to crops caused by heavy rains during the harvesting. In general, there was very little change in the amount and variety of the crops grown. Alfalfa was the principal crop, but no alfalfa seed was reported, as the season was too rainy for this crop. Excellent returns were received from pears, but the cantaloupe crop was almost a failure financially, due to inability to secure a market. Good results are expected from irrigation during 1915, as there is an abundance of stored water at Elephant Butte.



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*Crop report of irrigated lands, Rio Grande project, Mesilla Valley, Leasburg unit (Reclamation Service operation), year of 1914.*

Irrigated crop.	Area (acres).	Unit of yield.	Yields.		Values.		
			Total.	Average per acre.	Per unit of yield.	Total.	Per acre.
Alfalfa.....	12, 648	Tons.....	44, 268	3.5	\$10.50	\$464, 814	\$36.75
Barley.....	33	Bushels.....	990	30.0	.75	742	22.50
Beans.....	240	do.....	1, 320	5.5	1.80	2, 376	9.90
Cantaloupes.....	81	Crates.....	16, 200	200.0	1.25	20, 250	250.00
Corn.....	3, 205	Bushels.....	57, 690	18.0	.84	48, 460	15.12
Garden.....	533					31, 980	60.00
Grapes.....	68	Pounds.....	138, 000	2, 000.0	.03	4, 080	60.00
Milo maize.....	287	Bushels.....	5, 740	20.0	.75	4, 305	15.00
Oats.....	639	do.....	28, 755	45.0	.54	15, 528	24.30
Orchard.....	363	Pounds.....	3, 630	10, 000.0	.024	90, 750	250.00
Pasture.....	274				13.00	3, 562	13.00
Wheat.....	1, 250	Bushels.....	43, 750	35.0	.90	39, 375	31.50
Less duplicated areas.....	19, 621						
	1, 066						
Total acreage cropped under irrigation.....	18, 555	Total and average.....				726, 222	39.14
Irrigated, not cropped:							
Nonbearing orchard.....	420						
Miscellaneous.....	21						
Grand total irrigated.....	18, 996						
Areas.							Acres.
Total irrigable area farms reported.....							1 19, 500
Total irrigated area farms reported.....							18, 996
Total cropped area farms reported.....							18, 555

<sup>1</sup> 543 farms.

*Crop report of irrigated lands, Rio Grande project, El Paso Valley (Reclamation Service operation), year of 1914.*

Irrigated crop.	Area (acres).	Unit of yield.	Yields.		Values.		
			Total.	Average per acre.	Per unit of yield.	Total.	Per acre.
Alfalfa.....	5, 772	Ton.....	21, 760	3.8	\$10.00	\$217, 600	\$37.70
Apples.....	4	Pound.....	42, 080	10, 520	.02	842	210.40
Barley.....	29	Bushel.....	975	33.6	.67	653	22.53
Beans.....	80	do.....	640	8	1.80	1, 152	14.40
Cantaloupes.....	175	Crate.....	(1)				
Chili.....	40	Pound.....	240, 000	6, 000	.03	7, 200	180.00
Corn.....	567	Bushel.....	11, 119	19.6	.78	8, 673	15.30
Garden tracts.....	1, 048				150.00	157, 200	150.00
Oats.....	38		1, 088	28.6	.54	582	15.66
Onions.....	35	Pound.....	483, 000	13, 800	.01	4, 830	138.00
Pastures.....	145				10.00	1, 450	10.00
Pears.....	75	Pound.....	492, 168	6, 562	.025	12, 304	164.06
Peaches.....	5	do.....	133, 720	26, 744	.03	4, 012	802.32
Sorghum (grain).....	54	Bushel.....	1, 800	35	.70	1, 323	24.50
Sorghum (hay).....	152	Ton.....	304	2	7.00	2, 128	14.00
Sweet potatoes.....	60	do.....	180	3	20.00	3, 600	60.00
Vineyards.....	8	Pound.....	64, 000	8, 000	.03	1, 620	240.00
Watermelons.....	60	do.....	604, 000	10, 066	.006	3, 624	60.40
Wheat.....	400	Bushel.....	6, 000	15	.90	5, 400	13.50
Total acreage cropped under irrigation.....	8, 747	Total and average.....				434, 498	49.67
Irrigated, not cropped:							
Young orchard.....	555						
Miscellaneous.....	144						
Grand total irrigated.....	9, 446						
Areas.							Acres.
Total irrigable area farms reported.....							2 11, 300
Total irrigated area farms reported.....							9, 446
Under rental contracts.....							9, 446
Total cropped area farms reported.....							8, 747

<sup>1</sup> No market.

<sup>2</sup> 230 farms.

## FINANCIAL STATEMENTS.

*Assets, liabilities, reserves, and capital, Rio Grande project, to June 30, 1915 (exclusive of Elephant Butte storage).*

## ASSETS.

Cash in employees' hands awaiting transfer to fiscal agent.....	\$2.75
Accounts receivable:	
Uncollected water rentals.....	\$572.21
Uncollected miscellaneous items.....	21.80
Total.....	594.01
Inventories:	
Mercantile stores stock on hand.....	483.15
Animals.....	2,615.97
Mechanical and other equipment.....	35,560.26
Materials and supplies on hand in storehouse.....	28,680.81
Undistributed cost (freight and handling).....	2,174.11
Total.....	69,514.30
Construction work in process:	
Gross expenditure for construction of project to date. \$1,434,133.40	
Less revenue earned during construction,	
as follows:	
Rental of cottages.....	\$510.69
Rentals of irrigation water.....	136,504.13
Contractors' freight refunds.....	2,114.34
Loss on mess houses.....	<sup>1</sup> 1,718.47
Profits on mercantile stores.....	179.76
Profits on hospital.....	6,662.68
Total deductions.....	144,253.13
Net expenditures for construction of project to date.....	1,289,880.27
Total assets.....	1,359,991.33

## LIABILITIES, RESERVE, AND CAPITAL.

Accounts payable:	
Unpaid labor.....	\$14,080.07
Unpaid purchases.....	7,715.07
Unpaid freight and express charges.....	17,076.09
Unpaid passenger fares.....	379.25
Unpaid agreements to purchase real estate.....	20,222.15
Unredeemed coupons.....	14.85
Unredeemed meal tickets.....	249.10
Total.....	\$59,736.58
Net investment:	
Disbursements.....	\$1,401,787.91
Transfers received from other projects.....	72,665.74
Less—	
Collections.....	141,666.17
Transfers issued to other projects.....	32,532.73
Total.....	174,198.90
Total.....	1,300,254.75
Total liabilities, reserves, and capital investment of the Government.....	1,359,991.33

<sup>1</sup> Deduct.

*Functional feature costs of Rio Grande project to June 30, 1915 (exclusive of Elephant Butte storage).*

Examination and surveys.....	\$142, 635. 25
Canal system.....	1, 011, 728. 82
Lateral system.....	16, 577. 90
Drainage system.....	12, 835. 14
Flood protection.....	1, 348. 54
Farm units.....	120, 396. 84
Permanent improvements and land.....	12, 784. 59
Telephone system.....	6, 089. 45
Operation and maintenance during construction.....	109, 736. 87
<b>Total.....</b>	<b>1, 434, 133. 40</b>

*Estimated cost of contemplated work, Rio Grande project (exclusive of Elephant Butte storage), during fiscal year 1916.*

Examination and surveys.....	\$2, 491. 00
Canal system.....	268, 090. 00
Lateral system.....	10, 000. 00
Drainage system.....	5, 000. 00
Flood protection.....	5, 000. 00
Farm units.....	1, 000. 00
Permanent improvements and lands.....	1, 291. 00
Telephone system.....	7, 474. 00
Operation and maintenance.....	62, 288. 00
Stores and other operations (reimbursable accounts).....	15, 000. 00
Unallotted to features.....	26, 966. 00
<b>Total.....</b>	<b>404, 600. 00</b>

*Assets, liabilities, reserves, and capital, Elephant Butte storage, June 30, 1915.*

## ASSETS.

Accounts receivable, uncollected miscellaneous items.....	\$60. 25
Inventories:	
Mercantile stores stock on hand.....	\$26, 023. 34
Mechanical and other equipment.....	207, 811. 47
Animals.....	6, 070. 38
Material and supplies on hand in storehouse.....	85, 019. 30
Goods in transit.....	23. 00
Unadjusted transfers between projects.....	1, 168. 86
Undistributed cost (freight and handling on inventory property).....	<sup>1</sup> 19, 522. 55
	306, 593. 80
Construction work in progress:	
Gross expenditures for construction of project to date.....	5, 115, 591. 53
Less revenues earned during construction as follows:	
Rentals of cottages.....	<sup>1</sup> \$21, 009. 16
Rentals of power and light.....	2, 243. 33
Miscellaneous revenues.....	5, 068. 54
Contractors' freight refunds.....	2, 189. 34
Forfeitures by defaulting bidders and contractors.....	5, 243. 43
Profits on mess houses.....	7, 359. 53
Profits on mercantile stores.....	82, 260. 15
Profits on hospital.....	1, 040. 89
Adjustments—	
Depreciation on plant and equipment.....	822, 676. 22
<b>Total deductions.....</b>	<b>907, 072. 27</b>
<b>Net expenditures for construction of project to date.....</b>	<b>4, 208, 519. 26</b>
<b>Total assets.....</b>	<b>4, 515, 173. 31</b>

<sup>1</sup> Deduct.

## LIABILITIES, RESERVES, AND CAPITAL.

## Accounts payable:

Unpaid progress earnings under construction contracts.....	\$2,760.00	
Unpaid labor.....	18,942.61	
Unpaid purchases.....	12,519.39	
Unpaid contract holdbacks.....	1,200.00	
Unpaid freight and express charges.....	87,152.86	
Unpaid passenger fares.....	133.30	
Unpaid agreements to purchase real estate.....	11,662.55	
Unredeemed coupon books.....	563.60	
Unpaid miscellaneous.....	992.00	
		<u>\$135,926.31</u>

## Net investment:

Disbursements.....	\$4,437,258.09	
Transfers received from other projects.....	205,626.22	
		<u>4,642,884.31</u>

## Less—

Collections.....	212,473.15	
Transfers issued to other projects.....	51,164.16	
		<u>263,637.31</u>

Total..... 4,379,247.00

Total liabilities, reserves, and capital investment of the Government..... 4,515,173.31

*Functional feature costs of Elephant Butte storage to June 30, 1915.*

Storage system.....	\$5,055,486.68
Permanent improvements and land.....	36,084.92
Stores and other operations (reimbursable accounts).....	24,019.93
Total.....	<u>5,115,591.53</u>

*Estimated cost of contemplated work, Elephant Butte storage, during fiscal year 1916.*

Storage system.....	\$521,531.60
Permanent improvements and lands.....	5,868.40
Stores and other operations (reimbursable accounts).....	80,000.00
Total.....	<u>607,400.00</u>

## **NORTH DAKOTA, NORTH DAKOTA PUMPING PROJECT.**

W. S. ARTHUR, acting project manager, Williston, N. Dak.

### **LOCATION.**

County: Williams.

Townships: 152 to 155 N., Rs. 100 to 104 W., fifth principal meridian.

Railroad: Great Northern.

Railroad stations and estimated population January 1, 1915: Buford, 75; Trenton, 150; and Marley (less than 25). On Buford-Trenton unit are small unincorporated villages. Williston, on the Williston unit, is an incorporated city of about 4,500 population.

### **WATER SUPPLY.**

Source of water supply: Missouri River.

Area of drainage basin: 155,000 square miles.

Mean run-off of Missouri River, near Williston, May to October, 1905 to 1907: 15,000,-000 acre-feet.

### **AGRICULTURAL AND CLIMATIC CONDITIONS.**

Area for which the service is prepared to supply water, season 1915: Buford-Trenton unit, 4,049 acres; Williston unit, 8,189 acres.

Area under water-right applications and water-rental contracts to June 30, 1915: 5,706.48 acres.

Area irrigated, season 1914: 1,056 acres on Williston unit. No part of the Buford-Trenton unit was irrigated. In 1915 the Williston unit is being operated for commercial power, under a contract with the city of Williston, and no land will be irrigated.

Length of the irrigation season: 80 days, beginning from June 1 to June 15. In 1914 the actual irrigation season began June 1 and closed August 19.

Average elevation of the irrigable area: 1,900 feet above sea level.

Rainfall: The actual precipitation, calendar year 1914, was 16.58 inches. The average for 11 years, beginning 1904, was 13.16 inches. Precipitation was above normal in 1914. In the month of June 6.68 inches of rain fell, and the rainfall was the heaviest for any year but one since the weather records have been kept for this section. The heavy rains of June decided many not to take water during the season.

Range of temperature on irrigable area:  $-49^{\circ}$  to  $107^{\circ}$  F.

Character of soil on irrigable area: Ranges from sandy loam to heavy clay gumbo.

Principal products: Alfalfa, grain, vegetables. The production of corn is rapidly increasing and the hogs quadrupled in the last fiscal year.

Principal markets: St. Paul, Minneapolis, Duluth, Chicago. With the establishment of the dairy industry and hog raising the local market has become as important as the more distant ones.

### **LANDS OPENED FOR IRRIGATION.**

Dates of public notices and orders: Buford-Trenton unit, April 8, 1908; March 9, 1911; May 13, 1911; June 25, 1912; July 15, 1913; February 26, 1914; March 7, 1914. Williston unit, April 27 and November 30, 1908; April 30, 1909; March 9 and April 14, 1911; June 25, 1912; March 11, 1913; June 23, 1913; July 15, 1913; July 21, 1913; February 26, 1914; March 7, 1914.

Location of lands opened: Buford-Trenton unit, Ts. 152 and 153 N., Rs. 103 and 104 W., fifth principal meridian; Williston unit, Ts. 154 and 155 N., Rs. 100 and 101 W., fifth principal meridian.

Present status of irrigable lands: Buford-Trenton unit, 248 acres entered subject to reclamation act; 212 acres open to entry; 91 acres of State lands; 3,420 acres in private ownership. Williston unit, 54 acres entered subject to the reclamation act; 289 acres open to entry; 67 acres of State land; 7,779 acres in private ownership.

Limit of area of farm units: Public, 80 acres; private, 160 acres.

Duty of water: Two acre-feet per acre per annum at the farm.

Building charge per acre of irrigable land: \$38 under public notice of 1908.

Annual operation and maintenance charge: 70 cents per acre of irrigable land and 50 cents per acre-foot of water actually used, under public notices of 1908; \$1.50 per acre of irrigable land and \$1 per acre-foot of water used under order of May 13, 1911. For season of 1914 the project was on a rental basis and the terms were \$1 per acre, including 1 acre-foot of water, and \$1 per acre-foot for water delivered in excess of 1 acre-foot per acre.

### CHRONOLOGICAL SUMMARY.

Reconnaissance and preliminary surveys begun in 1903.

Construction recommended by board of engineers September 22, 1905.

Construction authorized by Secretary January 23, 1906.

First division: Buford-Trenton unit, completed November, 1907.

Power and pumping plants: Williston unit, completed for present use in the fall of 1907; first division completed in the spring of 1908.

Pumping plant and transmission lines: Buford-Trenton unit, completed for present use in the spring of 1908.

First irrigation by Reclamation Service, season of 1908.

Power installation completed for 2,000 horsepower June 30, 1910.

Buford-Trenton unit, 38 per cent completed June 30, 1915; Williston unit, 64 per cent completed June 30, 1915.

Entire project, 50 per cent completed June 30, 1915.

### IRRIGATION PLAN.

The irrigation plan of the North Dakota pumping project provides for a central steam power plant located near Williston, operating pumps and generating electricity for the operation of other pumps on the Buford-Trenton and Williston units. On the Buford-Trenton unit water is pumped from a barge into a settling basin 30 feet above the river, and is then lifted by a permanent pumping station into a canal, 50 feet above the settling basin, for the irrigation of bench lands near Buford. A transmission line 28.3 miles in length delivers power for the operation of the pumps. The plan of the Williston unit provides for a series of motor-driven centrifugal pumps on a barge in the Missouri River, a settling basin receiving the water from the barge, and a main canal of 90 second-feet capacity extending along Little Muddy Creek to the power plant, where two sets of steam-driven turbines operate centrifugal pumps to lift water 51 feet into E Canal. From the main canal, about midway between the river and the power plant, electrically driven pumps raise 35 second-feet 28 feet into B Canal, and from the B Canal 20 second-feet are raised an additional 28 feet into C Canal. The main power station is located close to a 9-foot vein of lignite coal, from which fuel is obtained.

The United States claims all waste, seepage, spring, and percolating water arising within the project, and proposes to use such water in connection therewith.

The features of the above irrigation plan which have been completed are: The central power station, coal mine and transmission lines; at Buford-Trenton unit, two pumping stations, settling basin, and canal system; at Williston unit, four pumping stations, two settling basins, and canal system. No construction work is in progress at present.

Features remaining for future construction are: The enlargement of the power house and installation of additional machinery; at Buford-Trenton unit, extension of High-line Canal and construction of Lowline Canal and laterals for irrigation of bottom lands; at Williston unit, construction of east and west bottom canal systems, with additional intake and pumping stations.

### CONSTRUCTION DURING FISCAL YEAR.

No construction work was undertaken during the fiscal year.

### OPERATION AND MAINTENANCE.

During the irrigation season of 1914, subsequent to June 30, the power plant, coal mine, transmission line, the Williston barge pumping station, pumping stations No. 2 and No. 4, settling basin, and 31 miles of canal were operated.

Of the total irrigable acreage of the Williston unit 2,485.02 acres, or 30.3 per cent, qualified to receive water. Of this irrigable acreage

1,056, or 42.5 per cent, were actually irrigated. This was less than 13 per cent of the total irrigable area of the Williston unit. Forty-four farms were irrigated, not including agricultural tracts of 1 acre or less, not classed as farms. The amount of water supplied to the land was 1,791.50 acre-feet, or an average of 1.7 acre-feet per acre irrigated.

During the year 7,144 tons of coal were mined for consumption in the power plant at an average unit cost of \$1.37 per ton.

The central power station and pumping barge were operated 65 days during the irrigation season. It is needless to say that a much larger acreage could have been irrigated, or that the plant could not operate with reasonable efficiency under these conditions.

The irrigation season began June 1 and up to the end of the fiscal year 1914, 375 acres had been irrigated and 686 acre-feet of water pumped. During the second two months of the irrigation season (the first two of the fiscal year 1915) 681 additional acres were irrigated and 1,984.34 acre-feet of water pumped. The year was the wettest but one in the 43 years that the weather records have been kept in this section.

*Historical review, North Dakota pumping project.*

WILLISTON UNIT.

Item.	1910	1911	1912	1913	1914	1915 <sup>1</sup>
Area for which service was prepared to supply water.....	8,189.31	8,189.31	8,189.31	8,189.31	8,189.31	8,189.31
Acreage irrigated.....	1,403	2,426	323	1,739	1,056	.....
Number of farms irrigated.....	43	77	16	54	44	.....
Miles of canal operated.....	32	37	18	32	31	.....
Water diverted (acre-feet).....	4,765.74	4,299.70	750.32	3,637.74	2,670.83	.....
Water delivered to land (acre-feet).....	2,379	2,952	278	2,287.70	1,791.50	.....
Per acre of land irrigated (acre-feet).....	1.69	1.22	0.86	1.31	1.7	.....

BUFORD-TRENTON UNIT.

Area for which service was prepared to supply water.....	4,049	4,049	4,049	4,049	4,049	4,049
Acreage irrigated.....	457	1,163	.....	.....	.....	.....
Number of farms irrigated.....	10	21	.....	.....	.....	.....
Miles of canal operated.....	8	12.75	.....	.....	.....	.....
Water delivered to land (acre-feet).....	662	1,472	.....	.....	.....	.....
Per acre of land irrigated (acre-feet).....	1.45	1.27	.....	.....	.....	.....

<sup>1</sup> To June 30; estimated.

COMMERCIAL POWER.

A contract with the city of Williston, dated October 16, 1912, covering the delivery of surplus electrical energy from the power plant, was in force, and some portion of the plant was in operation the entire year to furnish energy in compliance with this contract.

During the fiscal year 531,850 kilowatt-hours of electrical energy were delivered to the city switchboard. This represented an increase of 22 per cent over the commercial service for the previous year. During this period seven interruptions occurred, the longest being on November 29, 1914, of 1 hour and 55 minutes, for the purpose of permitting changes in the city lines. Six of the seven interruptions were by request of the city. The seventh interruption was at the

instance of the Reclamation Service to permit of connecting a new low-tension line. The work was done during a Sunday afternoon, and thus obviated any danger of handling live wires. After this connection was made the city's service was greatly improved. The following is a statement of results of the operation of this contract for the fiscal year:

*Sale of commercial power, North Dakota pumping project.*

Year and month.	Cost.		Collections.		Profit.	
	This month.	Total to date.	This month.	Total to date.	This month.	Total to date.
<b>1914.</b>						
July.....	\$814.32	\$28,965.22	\$1,390.50	\$29,342.70	\$576.18	\$377.48
August.....	796.52	29,761.74	1,372.50	30,715.20	575.98	953.46
September.....	1,815.82	31,577.56	1,666.00	32,281.20	* 249.82	703.64
October.....	1,912.66	33,490.21	1,855.00	34,136.20	* 57.65	645.99
November.....	1,849.13	35,339.34	1,943.75	36,079.95	94.62	740.61
December.....	1,911.81	37,251.15	2,067.50	38,147.45	155.99	896.30
<b>1915.</b>						
January.....	2,031.27	39,282.42	1,981.25	40,128.70	* 50.02	846.28
February.....	1,844.32	41,126.74	1,800.00	41,928.70	* 44.32	801.96
March.....	2,023.45	43,150.19	1,867.50	43,796.20	* 155.95	646.01
April.....	1,885.09	45,035.88	1,800.00	45,596.20	* 85.99	560.32
May.....	1,764.85	46,800.73	1,846.25	47,442.45	81.40	641.72
June.....	1,800.00	43,600.73	1,818.75	49,261.20	18.75	660.47

\* Estimated.

\* Loss.

In addition to the above gain, the contract returned during the fiscal year \$1,347.51 of the cost of preparing the plant for winter operation and \$1,985 plant depreciation, a total of \$3,332.51.

During the last three months of the fiscal year the city water-supply pumps were connected, and this service has added about 15 per cent to the load of corresponding months of the previous year. At the close of the year the project was not in operation for irrigation, and the water users and city officials were making a determined effort to make sufficient increase in the commercial power load to offset any deficit that may result from irrigation operations, and thus secure the operation of the project in 1917.

#### SETTLEMENT.

Settlement conditions on the project are practically stationary, due to the large percentage of lands in private ownership. No decided increase in farm population will occur until an organized effort is made by local agencies to sell portions of the larger farms, and this is perhaps the chief problem in the agricultural success of the project. While practically no new settlers arrived in the year, a very marked improvement was made in the conditions of the present settlers, in new farm buildings, barns and silos, and new dwelling houses.

More than half the acreage in the project, both irrigated and unirrigated, is owned by nonresidents. These nonresidents, waiting for the unearned increment, are responsible for the slow development of the project.



Three farmers' clubs are organized and active on the project; also a breeders' association. In the city of Williston a cooperative creamery has been in operation about a year and is making about 15,000 pounds of butter per month. An ice-cream factory was added during the last month of the year. There is also a farmers' cooperative elevator and a tannery. These bear a very close relation to the development of the project, especially the creamery, the cream coming from cows fed on alfalfa from the project farms. Settlement data of the two units of the project are summarized in the following tables:

*Settlement data, North Dakota pumping project.*

**WILLISTON UNIT.**

Item.	1912	1913	1914	1915
Total number of farms on project.....	93	101	101	101
Population of.....	172	146	146	183
Number of irrigated farms.....	16	54	26	44
Number operated by owners or managers.....	8	32	18	34
Number operated by tenants.....	8	22	8	10
Population of.....	48	162	72	140
Number of towns.....	2	2	2	2
Population of.....	4,700	4,700	4,700	5,000
Population in towns and on farms.....	4,872	4,912	4,801	5,183
Number of public schools.....	4	4	4	5
Number of churches.....	5	5	5	6
Number of banks.....	5	3	3	3
Total capital stock.....			\$135,000	\$135,000
Total amount of deposits.....				\$1,300,000
Total number of depositors.....				3,000

**BUFORD-TRENTON UNIT.**

Total number of farms on project.....	34	33	42	42
Population of.....	53	69	70	70
Number operated by owners or managers.....	19	10	19	19
Number operated by tenants.....	2	23	23	23
Number of towns.....	2	2	2	2
Population of.....	350	350	350	400
Total population on farms and in towns.....	420	420	420	.....
Number of public schools.....	1	1	1	2
Number of churches.....	2	2	2	.....
Number of banks.....	1	1	1	2
Total capital stock.....			\$10,000	\$20,000
Total amount of deposits.....			\$100,000	\$115,000
Total number of depositors.....			200	240

**PRINCIPAL CROPS.**

Alfalfa is of course the principal crop. Of the 1,056 acres irrigated 901 acres were in alfalfa. The average yield of the acreage in alfalfa was \$30.70. Nothing in this section yields the farm equal return for the labor except truck, potatoes, etc., and of such crops the acreage must necessarily be small. On the irrigated lands the farmers have practically abandoned small grains and cattle, hogs, and dairying are now their chief business. Dairy herds are being build up as rapidly as possible. Corn for silage is a pronounced success. Potatoes were an important crop during the year and yielded an average return of \$116 per acre.

The value of the crops on the irrigated portion of the project was \$34.87 per acre and on the nonirrigated \$11.33.

*Crop report of irrigated lands, North Dakota pumping project—Williston unit, year of 1914.*

Irrigated crop.	Area, acres.	Unit of yield.	Yields.		Values.		
			Total.	Average per acre.	Per unit of yield.	Total.	Per acre.
Alfalfa.....	865	Tons.....	2,213.3	2.56	\$12.00	\$26,560	\$30.70
Barley.....	17	Busbels...	441	26	.41	181	10.64
Cabbage.....	4.5	Tons.....	8.8	1.95	60.00	528	117.33
Celery.....	1.5	Dozen.....	2,167	1,444.63	.75	1,625	1,083.60
Corn.....	12.75	Busbels...	712	55.84	.50	336	27.92
Flax.....	5	do.....	50	10	1.25	62	12.50
Garden.....	12.75	.....	.....	.....	.....	637	50.00
Hay (native).....	21.50	Tons.....	41.1	1.91	6.00	247	11.47
Hay (oat).....	1	do.....	6	6	3.00	18	18.00
Oats.....	16	Busbels...	665	41.56	.35	233	14.55
Onions.....	1	do.....	300	300	1.00	300	300.00
Pasture (alfalfa).....	25	.....	.....	.....	.....	900	33.00
Potatoes.....	35.75	Busbels...	6,912	193.34	.60	4,147	116.00
Rye.....	1	do.....	.....	.....	.85	.....	.....
Rutabagas.....	.5	do.....	80	160	.50	40	80.00
Tomatoes.....	.75	.....	.....	.....	.....	150	200.00
Wheat.....	25	Busbels...	456	18.24	1.00	456	18.25
Less duplicated areas.....	1	.....	.....	.....	.....	.....	.....
Total acreage cropped under irrigation.....	1,045	Total and average.....	.....	.....	.....	\$36,440	\$34.87
Irrigated, not cropped: Young alfalfa.....	11	.....	.....	.....	.....	.....	.....
Grand total irrigated.....	1,056	.....	.....	.....	.....	.....	.....

Areas.	Acres.	Number of farms.	Per cent of project
Total irrigable area farms reported.....	2,485.02	44	30
Total irrigated area farms reported.....	1,056	44	13
Under rental contracts.....	1,056	44	13
Total cropped area farms reported.....	1,056	44	13

*Crop report of lands dry-farmed on North Dakota pumping project (Williston unit) year of 1914.*

Crop.	Area acres.	Unit of yield.	Yields.		Values.		
			Total.	Average per acre.	Per unit of yield.	Total.	Per acre.
Alfalfa.....	639	Tons.....	1,229.77	1.92	\$12.00	\$14,757	\$23.09
Beans.....	1	Busbels...	12.00	12.00	3.00	36	36.00
Barley.....	356	do.....	9,592.00	26.92	.41	3,933	11.04
Corn.....	29	do.....	571.00	19.70	.50	285	9.84
Corn (fodder).....	80	Tons.....	351.50	4.39	5.00	1,757	21.97
Cabbage.....	8.5	do.....	10.75	1.26	60.00	645	75.88
Flax.....	143	Busbels...	1,576.00	11.06	1.25	1,970	13.82
Garden.....	24	.....	.....	.....	.....	1,177	50.00
Hay.....	672	Tons.....	618.60	.92	6.00	3,712	5.53
Oats.....	258	Busbels...	7,996.00	30.99	.35	2,799	10.85
Onions.....	3.5	do.....	700.00	200.00	1.00	700	200.00
Peas (field).....	2	do.....	.....	.....	.....	.....	.....
Pasture.....	1,140	.....	.....	.....	.....	570	.60
Potatoes.....	49.9	Busbels...	6,613.14	132.39	.60	3,968	79.44
Rye.....	27	do.....	323.00	11.75	.85	275	9.98
Sugar beets.....	0.1	Tons.....	1.69	16.90	5.00	8	84.50
Timothy (seed).....	2	Busbels...	10.00	5.00	4.00	40	20.00
Wheat.....	449	do.....	7,395.00	16.45	1.00	7,395	16.45
Total acreage cropped by dry-farming.....	3,884	Total and average.....	.....	.....	.....	44,028	11.33
Dry-farmed, not cropped: Young alfalfa.....	75	.....	.....	.....	.....	.....	.....
Total.....	3,959	.....	.....	.....	.....	.....	.....

Areas.	Acres.	Number of farms.	Per cent of project.
Total irrigable area farms reported.....	5,704.29	116	70
Total cropped area farms reported.....	3,884	.....	43

**SUSPENSION OF IRRIGATION OPERATIONS.**

No appropriation was made for irrigation during the fiscal year 1916, therefore no water was pumped for irrigation during June, the last month of the fiscal year 1915, inasmuch as the preparatory expense for one month of irrigation would have been prohibitive.

The water users are endeavoring to increase the commercial load and the acreage upon which collections may be made, to secure sufficient receipts from the combined operations to make the project self-supporting in the irrigation season of 1917.

**FINANCIAL STATEMENTS.**

*Assets and liabilities, North Dakota pumping project, to June 30, 1915.*

**ASSETS.****Accounts receivable:**

Construction charges due and uncollected from water-right applicants.....	\$39,565.30
Construction charges unaccrued on contracts with water-right applicants.....	232,088.54
Operation and maintenance charges due and uncollected from water-right applicants.....	11,314.63
Uncollected rentals of irrigation water.....	1,176.07
Uncollected rentals of power and light.....	1,818.75

Total..... **\$285,963.29**

**Inventory of stock on hand:**

Mercantile store, stock on hand.....	\$1,106.79
Government animals.....	458.33
Mechanical and other equipment.....	10,020.36
Materials and supplies on hand in store-houses.....	5,677.03
Undistributed credit (freight and handling).....	<sup>1</sup> 9.72

Total..... **17,252.79**

**Construction work in process:**

Gross expenditures for construction of project to date.....	735,343.41
Less revenues earned during construction as follows:	
Rentals of buildings.....	\$347.16
Rentals of irrigation water.....	196.75
Contractors freight refunds.....	5,495.08

**Adjustments:**

Depreciation on plant and equipment.....	1,333.00
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Total deductions..... **7,371.99**

Net expenditure for construction of project to date..... **727,971.42**

Deferred operation and maintenance charges..... **203,567.64**

Total assets..... **1,234,755.14**

**LIABILITIES, RESERVES, AND CAPITAL.****Accounts payable:**

Unpaid labor.....	\$30.00
Unpaid purchases.....	48.47
Unpaid freight and express.....	410.35
Unpaid passenger fares.....	32.89

Total..... **\$521.71**

<sup>1</sup> Deduct.

Reserves for repayment to reclamation fund of cost of project:

Value of construction contracts with water-right applicants.....	\$279,090.18	
Construction charges paid in advance by water-right applicants.....	1.43	
Construction charges paid and forfeited by water-right applicants.....	280.55	
Penalties on construction water-right charges paid by water-right applicants.....	.68	
Total.....		\$279,372.84
Net investment:		
Disbursements.....	\$1,021,445.61	
Transfers received from other projects.....	195,603.58	
		1,217,049.19
Less—		
Collections.....	79,086.41	
Collections, repayment refunds.....	153.00	
Transfers issued to other projects.....	182,949.19	
		262,188.60
Total.....		954,860.59
Total liabilities, reserves, and capital investment of the Government.....		1,234,755.14

*Functional feature costs, North Dakota pumping project, to June 30, 1915.*

Examination and surveys.....	\$44,542.46
Lateral system.....	199,270.47
Power system.....	445,881.96
Permanent structures and lands.....	23,456.59
Operation and maintenance charges compounded with construction..	22,191.93
Gross expenditures for construction of project to date.....	735,343.41

*Operating revenues and expenses, North Dakota pumping project, to June 30, 1915.*

EXPENSES.

Storage system:	
Operation.....	\$238,334.40
Maintenance.....	44,489.42
Canal system:	
Operation.....	100.99
Maintenance.....	2,178.99
Lateral system:	
Operation.....	24,608.06
Maintenance.....	10,013.77
Subtotal.....	319,725.63
Less operation and maintenance charges compounded with construction charges.....	22,191.93
Total.....	297,533.70

REVENUES.

Operation and maintenance charges accrued on contracts with water-right applicants.....	\$24,340.51
Operation and maintenance charges paid in advance by water-right applicants.....	101.20
Operation and maintenance charges paid and forfeited by water-right applicants.....	156.27
Penalties on operation and maintenance charges paid by water-right applicants.....	.23
Rentals of buildings.....	1,794.68

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Rentals of power and light.....	\$49,261.20
Rentals of irrigation water.....	2,768.35
Miscellaneous revenues.....	147.37
Estimated plant depreciation.....	12,325.04
Profit on mess-house operations.....	368.58
Profit on mercantile-store operations.....	1,973.37
Profit on hospital operations.....	251.66
Services of Government animals.....	477.60
Deferred operation and maintenance revenues (carried to debit side of assets and liabilities statement).....	203,567.64
<b>Total.....</b>	<b>297,533.70</b>

*Estimated cost of contemplated work, North Dakota pumping project, during fiscal year 1916.*

Operation and maintenance (public notice)—Power system .....	\$19,825.00
Stores and other operations:	
Reimbursable accounts—	
Mercantile store.....	\$100.00
Hospitals.....	75.00
	<u>175.00</u>
<b>Total.....</b>	<b>20,000.00</b>

## **OKLAHOMA, LAWTON PROJECT.**

P. M. Fogg, project manager, Lawton, Okla.

### **LOCATION.**

County: Comanche.

Townships: 2 and 3 N., Rs. 12 and 13 W., Indian meridian.

Railroads: St. Louis & San Francisco; Chicago, Rock Island & Pacific.

Railroad station and estimated population, January 1, 1915: Lawton, Okla., 8,000.

### **WATER SUPPLY.**

Source of water supply: Medicine Bluff and Little Medicine Bluff Creeks.

Area of drainage basin: 110 square miles.

Annual run-off in acre-feet of Medicine Bluff and Little Medicine Bluff Creeks at site of proposed diversion dam: Medicine Bluff Creek, including the run-off of Little Medicine Bluff Creek and the overflow from Lake Lawtonka, supplied by Medicine Bluff Creek, 1914, 17,835 acre-feet. The estimated natural run-off of Medicine Bluff Creek is 20,700 acre-feet, which includes the run-off at the proposed diversion dam plus the amount of water used by the city of Lawton and Fort Sill and the evaporation on the reservoir.

Reservoir: Storage capacity of top 20 feet of Lake Lawtonka, which was built by the city of Lawton, Okla., for domestic use. The reservoir has a total capacity of 14,000 acre-feet and covers an area of 1,082 acres. The reservoir is formed by a 50-foot masonry dam, which stores the waters of Medicine Bluff Creek, and it is estimated that the capacity of the top 20 feet, which the city of Lawton agreed to donate to the Government, is 12,000 acre-feet.

Irrigable area: Approximately 2,500 acres under present plan.

### **AGRICULTURAL AND CLIMATIC CONDITIONS.**

Length of irrigation season: April 1 to October 31—214 days.

Average elevation of irrigable area: 1,100 feet above sea level.

Average annual rainfall on irrigable area: 30 years, 31 inches; at Lake Lawtonka, 1914, 28 inches; at Lawton, Okla., 1914, 28 inches.

Range of temperature on irrigable area: 10° to 110° F.

Character of soil on irrigable area: Clay loam; rolling.

Principal products: Garden truck, melons, tomatoes, cabbage, onions, sweet potatoes, berries, fruit, forage crops, and cotton.

Principal markets: Lawton and Oklahoma City, Okla.; Kansas City and St. Louis, Mo.; Galveston, Tex.; and New Orleans, La.

### **CHRONOLOGICAL SUMMARY.**

Reconnaissance authorized by secretary April 29, 1912.

Reconnaissance begun June 12, 1912.

Gauging stations were established at Lake Lawtonka and on Little Medicine Bluff and Medicine Bluff Creeks, during the summer of 1912, and an evaporation raft placed on Lake Lawtonka. Arrangements were made with the United States Geological Survey to rate the streams and keep records of rainfall, evaporation, and run-off. An automatic gauging station was placed in Medicine Bluff Creek in the winter of 1914.

An allotment of \$100,000 was approved by the Secretary of the Interior on January 24, 1914, for the construction of the project under certain conditions. These included the formation of an acceptable water users' association, the subscription of about 1,900 acres of irrigable land in a compact body close to the 600 acres of Indian school land to be included, and agreement for division of holdings into small farms.

On August 1, 1914, an act of Congress was passed authorizing the inclusion of 600 acres of Indian school land in the project.

An office was opened at Lawton, Okla., and surveys begun in August, 1914, by Mr. P. M. Fogg, engineer, and continued to February, 1915, when work was discontinued pending the signing of the required acreage by the land owners.

### IRRIGATION PLAN.

The irrigation plan for the Lawton project provides for the storage of the water of Medicine Bluff Creek in the Lawton Reservoir, or Lake Lawtonka, the top 20-foot capacity of which has been donated to the Government by the town of Lawton for this use, and the direct diversion of the water of Little Medicine Bluff Creek, a diversion dam in Medicine Bluff Creek and distribution of the water through a canal approximately 7 miles long, irrigating about 2,500 acres in the vicinity of Lawton, Okla. The area to be irrigated has not been definitely selected at this time, but will be adjacent to and include about 600 acres of Indian land north of Lawton.

### CONSTRUCTION DURING FISCAL YEAR.

*Preliminary surveys.*—In August, 1914, headquarters were established at Lawton, Okla., and a survey party was organized for the preliminary work in the location of the diversion dam and main canal. A series of permanent bench marks was established in the vicinity of the probable canal location, and later additional benches were set at points within the irrigable area. Sea-level elevations were determined for all of these.

After careful study of the situation a site for the diversion dam in Medicine Bluff Creek was selected within the boundary limits of the Fort Sill Military Reservation, and a number of trial locations for the canal were surveyed, from which the final line was selected and permanently located. Application for right of way for the canal through the reserve was prepared for submission to the War Department.

A topographic survey of the Indian school land to be included in the project was made, and a few trial lateral lines were surveyed to determine the limits of the irrigable private lands.

In February, 1915, the office was closed and further developments postponed pending the completion of the efforts of the Lawton Water Users' Association to secure subscriptions of 1,900 acres of irrigable private lands for the project.

*Soil surveys.*—In October, 1914, a soil examination was made by an expert from the Department of Agriculture. This covered the irrigable area of the project. The resultant report was favorable as to the effect of irrigation on the soils.

### FINANCIAL STATEMENTS.

*Assets, liabilities, reserves, and capital, Lawton project, to June 30, 1915.*

#### ASSETS.

Inventories—Mechanical and other equipment.....	\$1,166.97
Construction work in process:	
Gross expenditures for construction of project to date.....	\$7,897.75
Less profits on hospital.....	<sup>1</sup> 7.00
Net expenditures for construction of project to date.....	7,890.75
Total assets.....	9,057.72

<sup>1</sup> Deduct.

## LIABILITIES, RESERVES, AND CAPITAL.

Accounts payable:			
Unpaid purchases.....		\$15. 55	
Unpaid freight and express.....		5. 66	
Unpaid passenger fares.....		49. 32	
			\$70. 53
Net investment:			
Disbursements.....	\$7, 616. 31		
Transfers received from other projects.....	1, 385. 88		
		9, 002. 19	
Transfers issued to other projects.....		15. 60	
Total.....			8, 987. 19
Total liabilities, reserves, and capital investment of the Government.			9, 057. 72

*Functional feature costs of Lawton project to June 30, 1915.*

Examination and surveys..... \$7, 897. 75

*Estimated cost of contemplated work, Lawton project, during fiscal year 1916.*

Unallotted to features..... \$40, 000. 00



## OREGON, COOPERATIVE WORK.

*Columbia River power project.*—An agreement between the United States and the State of Oregon, dated December 12, 1913, provided for surveys and investigations leading to the preparation of detailed plans, specifications, and estimates of cost for the maximum economical development of water power on the Columbia River near The Dalles, Oreg. It was also required that conclusions and recommendations in the matter of the use of public waters, lands, and other natural resources be made. This agreement was made pursuant to an act of the State of Oregon dated March 4, 1913, appropriating the sum of \$15,000 for the above purposes. The Secretary of the Interior allotted another \$15,000 for the purpose, and a total sum of \$30,000 was therefore available for the work.

The project contemplates the development of about 480,000 horsepower at a point on the Columbia River about 5 miles above The Dalles. To develop this power it would be necessary to build a dam across the Columbia at the head of Five Mile Rapids. The available head would vary between 45 feet and 105 feet. The available flow of water would vary from 50,000 second-feet to 800,000 second-feet. Plans for using the power for electrochemical, metallurgical, and other industries, as well as pumping for irrigation and for commercial uses, were considered. Various exhaustive investigations were made along the different lines of possible utilization of the energy.

A full report of the engineering features of the plan, which are very interesting by reason of the almost unprecedented scale of the proposed development, together with much detailed information on the use of large electric powers in electrochemical industries, metallurgy, and the arts, as well as a full presentation of the possibilities of pumping for irrigation purposes along the Columbia Valley, was finished by the engineers during November, 1914. This report was considered by a board of review appointed by the Secretary of the Interior, and many important conclusions and recommendations by the board are embodied in a special report dated November 25, 1914. This report has not been published.

*Deschutes project.*—Office work of designs, estimates, and preparation of report were continued to December, 1914. Report, with estimates of cost, maps, and plates, was published in February, 1915.

*Ochoco project and Crooked River investigations.*—Surveys for these investigations, including diamond-drill borings for Ochoco and Post Reservoir Dam sites, were made during the latter half of 1914. Office work of computations, designs, and preparation of report was completed in May, 1915, and request made for authority to publish.

*Silver Lake project.*—Preliminary surveys of this project were made during the latter part of 1914. Office studies were made during the winter, and some further field work, including soils survey, made in April of 1915. Studies have been completed and report is being prepared.

*Malheur project.*—Several alternatives for this project, together with Owyhee project, requiring a certain amount of field investigations, have been considered and studies of the project continued. It is expected that the report can be completed for publication within the next few months.

*John Day project.*—Field work, including test borings for two diversion sites in John Day Canyon, and also for Carty and Clarno Reservoir sites, was completed in March, 1915. Designs and estimates for the project have been largely completed, and it is expected that report will be ready for publication some time during the present year.

*Other projects.*—Some time has been given in the office to studies of Harney project, on which a report will be prepared. Field investigations are now being made which may develop one or more projects in Willamette Valley. Unless projects should be developed from these later investigations it appears that the work may close by the end of the calendar year.

#### FINANCIAL STATEMENTS.

*Assets, liabilities, reserves, and capital, Columbia River cooperation, to June 30, 1915.*

##### ASSETS.

Inventories—Equipment.....		\$33. 50
Building work in progress:		
Gross building expenses.....	\$16, 448. 51	
Adjustments.....	None.	
		<u>16, 448. 51</u>
Total assets.....		<u>16, 482. 01</u>

##### LIABILITIES, RESERVES, AND CAPITAL.

Net investment:		
Disbursements.....	\$14, 469. 55	
Transfers received.....	7, 010. 18	
		<u>21, 479. 73</u>
Less—		
Collections.....	218. 12	
Transfers issued.....	4, 779. 60	
		<u>4, 997. 72</u>
Total liabilities and investment.....		<u>16, 482. 01</u>

*Functional feature costs of Columbia River cooperation to June 30, 1915.*

Examination and surveys.....	<u>\$16, 448. 51</u>
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*Assets, liabilities, reserves, and capital, Oregon cooperative work, to June 30, 1915.*

##### ASSETS.

Inventories—Equipment.....		\$2, 066. 33
Building work in progress:		
Gross building expense.....	\$40, 488. 83	
Adjustments.....	None.	
		<u>40, 488. 83</u>
Total assets.....		<u>42, 555. 16</u>

## LIABILITIES, RESERVES, AND CAPITAL.

Accounts payable:	
Unpaid labor.....	\$1,414.88
Unpaid purchases.....	26.41
Unpaid freight.....	59.41
Unpaid passenger fares.....	52.40
Unpaid miscellaneous, rental of carbons.....	581.00
	<hr/>
	\$2,134.10
Net investment:	
Disbursements.....	36,379.19
Transfers received.....	10,344.96
	<hr/>
	46,724.15
Less--	
Collections.....	\$163.55
Transfers issued.....	6,139.54
	<hr/>
	6,303.09
	<hr/>
	40,421.06
Total liabilities and investment.....	<hr/>
	42,555.16
	<hr/>

*Functional feature costs, Oregon cooperative work, to June 30, 1915.*

Examination and surveys.....	\$40,488.83
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## **OREGON, UMATILLA PROJECT.**

H. D. NEWELL, project manager, Hermiston, Oreg.

### **LOCATION.**

Counties: Umatilla and Morrow.

Townships: 4 and 5 N., Rs. 24, 25, 26, 27, 28, and 29 E., Willamette meridian.

Railroads: Oregon-Washington Railroad & Navigation Co.; Northern Pacific.

Railroad stations and estimated population January 1, 1915: Hermiston, 600; Umatilla, 200.

### **WATER SUPPLY.**

Source of water supply: Umatilla River.

Area of drainage basin: 1,610 square miles.

Annual run-off in acre-feet: Umatilla River at Yoakum (1,200 square miles), 1903 to 1914, maximum, 723,000; minimum, 250,000; mean, 504,000.

### **AGRICULTURAL AND CLIMATIC CONDITIONS.**

Area for which service is prepared to supply water, season of 1915: 16,000 acres.

Area under water-right applications, season of 1915: 13,413 acres.

Length of irrigation season: From March 20 to October 16—210 days.

Average elevation of irrigable area: 470 feet above sea level.

Average annual rainfall on irrigable area: 8.3 inches; 1914, 6.6 inches.

Range of temperature on irrigable area:  $-28^{\circ}$  to  $115^{\circ}$  F.; ordinary minimum,  $0^{\circ}$  F.

Character of soil of irrigable area: Sandy loam.

Principal products: Alfalfa, fruits, berries, vegetables.

Principal markets: Portland, Oreg., and Spokane, Wash.

### **LANDS OPENED FOR IRRIGATION.**

Dates of public notices and orders: December 27, 1907; August 3, 1908; November 12, 1908; April 3, 1909; January 6, 1910 (two); February 28, 1911; May 16, 1911; March 2, 1912; May 8, 1912; March 3, 1913; April 7, 1913; June 23, 1913; July 15, 1913; July 21, 1913; January 19, 1914; September 24, 1914; February 25, 1915; April 5, 1915.

Location of lands opened: Tps. 4 and 5 N., Rs. 28 and 29 E., Willamette meridian.

Present status of irrigable area opened: 2,673 acres entered subject to reclamation act; 61 acres open to entry; 12,229 acres private lands.

Limit of area of farm units: Public, 40 acres; private, 160 acres.

Duty of water: 2.8 acre-feet per acre per annum at the farm.

Building charge per acre of irrigable land: \$60 and \$70.

Annual operation and maintenance charge: Varying with quantity of water used.

### **CHRONOLOGICAL SUMMARY.**

Reconnaissance and preliminary surveys begun in 1903.

Construction recommended by board of engineers October 27, 1905.

Construction authorized by Secretary December 4, 1905.

Diversion dam and feed canal completed August, 1907.

Cold Springs Dam completed June, 1908.

First irrigation by Reclamation Service season of 1908.

Construction of West Extension authorized December 22, 1913.

West Extension Diversion Dam completed November 28, 1914.

Entire project (including west extension) 74.3 per cent completed June 30, 1915.

### IRRIGATION PLAN.

The irrigation plan of the Umatilla project provides for the diversion of water from the Umatilla River above Echo, Oreg., through a feed canal 24.5 miles long, into a storage reservoir. Water is diverted from the reservoir through an outlet canal, also from the feed canal by means of a by-pass connecting the feed and outlet canals. Water is also diverted from the Umatilla River by the Maxwell Canal, heading near Butter Creek, and delivered into a distribution system from the reservoir, thus watering land in the Umatilla and Columbia River Valleys near Hermiston, Oreg. In addition some 10,000 acres bordering the Columbia River in the vicinity of Umatilla and Irrigon, Oreg., will be watered by a canal diverting from the Umatilla River about halfway between Hermiston and Umatilla.

The United States intends, for and in connection with the project, to use the waste, seepage, spring, and percolating water arising within the same, and asserts a right thereto by virtue of its reservation of all unappropriated waters of the project source of supply and of its appropriation of said waters in accordance with the State law, heretofore made, for the purpose of the project.

The features which have been completed are: The diversion works above Echo, feed canal, Cold Springs Dam, by-pass, diversion works for the Maxwell Canal, diversion works for the West Extension, main distributary, laterals for the first, second, third, and fourth units; also distributary for the Umatilla unit, to which water is being supplied on a rental basis. Four drain ditches have been built. The main construction work in progress is the building of the main distributary for the west extension.

### CONSTRUCTION DURING FISCAL YEAR.

One thousand one hundred lineal feet of 2-inch concrete side lining were placed in the feed canal a short distance above the siphon under the railroad.

*Distribution system.*—There were placed in the main distributary and lateral 8,780 lineal feet of 2-inch full concrete lining, 350 lineal feet of side and bottom lining, and 1,900 lineal feet of side lining. Five thousand five hundred lineal feet of 16-inch and 1,600 lineal feet of 20-inch cement pipe were laid.

*West Extension.*—Fourteen and eight-tenths miles of full concrete lining 3 inches thick were placed.

*Three Mile Falls Diversion Dam.*—Work began early in July by Morrison-Knudsen Co. of Boise, Idaho, contractors. The dam was completed the latter part of November, fully one month earlier than the time limit. The foregoing involved the excavation of 460,000 cubic yards of class 1, 41,000 cubic yards of class 2, and 7,400 cubic yards of class 3 material. Twenty-eight thousand cubic yards of concrete were placed.

### OPERATION AND MAINTENANCE.

Diversion of water for the Feed Canal for storage purposes was resumed October 26, 1914, and was continued to June 11, 1915. Sixty-one thousand one hundred acre-feet were diverted from the river for storage, of which 53,300 acre-feet reached the reservoir. A storage of 44,900 acre-feet was reached on June 7. The available storage on June 30, 1915, was 38,900 acre-feet. Delivery of water to the distribution system began on March 29, and the total discharge from the reservoir up to June 30 was 15,700 acre-feet. Delivery of water through the Maxwell Canal began on March 15. The total diversion to June 30 amounted to 10,200 acre-feet. The area of irrigable holdings during the present season is estimated to be 10,000 acres, the area actually irrigated at 5,500 acres.

*Historical review, Umatilla project.*

Item.	1910	1911	1912	1913	1914	1915 <sup>1</sup>
Acreage for which service was prepared to supply water.....	15,276	17,252	17,252	18,300	17,587	16,000
Acreage irrigated.....	2,500	3,500	4,600	6,000	5,100	6,500
Miles of canal operated.....	112	112	112	112	112	112
Water diverted (acre-feet).....	69,400	78,900	90,000	81,500	59,900	77,700
Water delivered to land (acre-feet).....	25,600	34,100	38,000	42,250	36,300	38,600
Per acre of land irrigated (acre-feet).....	10.2	9.7	8.2	8.45	7.1	7.0

<sup>1</sup> Estimated.**SETTLEMENT.**

The total population of the project in 1914 was 1,400, about 600 living within the corporate limits of the city of Hermiston. Settlement has advanced slowly. In the latter part of 1914 the Northern Pacific Co. offered their purchasers substantial reductions in price, conditioned on compliance with certain cultivation requirements and promptly meeting project charges due. On May 17, 1915, contract was executed with the Maxwell Land & Irrigation Co. whereby the company will be allowed to rent water for its holdings, conditional on improving so many acres annually. There are 5 tracts of public land, totaling 61 acres, open to homestead entry.

*Settlement data, Umatilla project.*

Item.	1913	1914	1915
Total number of farms on project.....	1,438	1,440	1,542
Population of.....	740	807	800
Number of irrigated farms.....	311	320	311
Operated by owners or managers.....	212	220	200
Operated by tenants.....	99	100	111
Population of.....	740	740	800
Number of towns.....	1	1	1
Population of.....	600	600	600
Population in towns and on farms.....	1,340	1,400	1,400
Number of public schools.....	2	2	3
Number of churches.....	4	4	4
Number of banks.....	1	1	1
Total capital stock.....	\$25,000	\$25,000	\$25,000
Total amount of deposits.....	\$100,000	\$100,000	\$85,000
Total number of depositors.....	600	600	600

<sup>1</sup> Number of water-right applications and rental contracts.**PRINCIPAL CROPS.**

During 1914 approximately 5,000 acres were irrigated and 3,000 acres cropped, the difference being mainly young orchards. The total value of crops was \$88,000, as compared with \$84,000 in 1913. The year was not especially favorable for crops, there being a warm period in the late winter followed by frosts in the spring which destroyed nearly all fruit. The year of 1914 was also one of short water supply. A good deal of damage was done by grasshoppers and rabbits.

The agricultural situation for 1915 is much better than the preceding. An April frost injured some of the fruit in the lower sections, but little or no damage was done on the higher elevations. There was a noticeable lack of wind in the early spring, making it unusually

favorable for seeding. During the early part of the season there were grave fears of a water shortage, which were fortunately removed by rains in May. Water-supply conditions will be much better than the previous year. Grasshoppers, which have been very destructive for the two preceding years, are doing little or no damage.

*Crop report, Umatilla project, Oregon, year of 1914.*

Irrigated crop.	Area (acres).	Unit of yield.	Yields.		Values.		
			Total.	Average per acre.	Per unit of yield.	Total.	Per acre.
Alfalfa.....	2,048.3	Tons.....	7,511	13.7	\$8.00	\$60,088	\$29.34
Apples.....	53.3	Pounds.....	29,682	556.8	.013	495	9.28
Artichokes.....	3.3	Bushels.....	1,420	433.3	.364	515	155.98
Clover hay.....	5.5	Tons.....	16	2.91	8.00	128	23.27
Clover seed.....	1.0	Bushels.....	1.5	1.5	14.00	21	21.00
Corn, Indian.....	51.0	do.....	1,800	34.9	.85	1,539	29.83
Corn, fodder.....	80.5	Tons.....	244	3	3.40	829	10.30
Fruits, small.....	64.8	Pounds.....	83,610	1,290.3	.05	4,181	64.51
Garden.....	38.6	do.....				4,726	122.44
Hay.....	110.5	Tons.....	108	.98	6.97	720	6.52
Melons.....	13.5	do.....	85.5	6.3	14.98	1,251	94.89
Onions.....	3.5	Bushels.....	628	179.4	.574	518	156.55
Pasture.....	541.8	Pounds.....	52,000	441	.013	7,023	13.04
Peaches.....	117.9	do.....	2,262	301.6	.04	90	6.62
Pears.....	7.5	Bushels.....	5,618	91.5	.89	5,000	81.43
Potatoes.....	61.4	do.....	42	14	1.20	50	16.80
Rye.....	3.0	do.....	290	38.7	.98	284	37.89
Wheat.....	7.5	do.....				275	10.22
Miscellaneous.....	26.9						
Less duplicated areas.....	227.0						
Total cropped acreage.....	3,013.4	Total and average.....				88,613	29.41
Irrigated, not cropped:							
Nonbearing orchards.....	1,273.3						
Young alfalfa.....	438.8						
Miscellaneous.....	344.6						
Rye.....	185.5						
Less duplicated areas.....	154.0						
Grand total/irrigated.....	5,101.6						

Areas.	Acres.	Farms.	Per cent of project. <sup>1</sup>
Total irrigable area farms reported.....	9,410.6	311	55.5
Total irrigated area farms reported.....	5,101.6	311	30
Under water-right applications.....	4,848.1	300	28.5
Under rental contracts.....	83.5	5	.5
Miscellaneous.....	170	6	1
Total cropped area farms reported.....	3,013.4	311	17.7

<sup>1</sup> Average yield for all stands, both old and new.

<sup>2</sup> Per cent based on 17,000 acres.

<sup>3</sup> Under Schedule A, 69.5 acres; under departmental regulations, 5.5 acres; under vested water right, 35 acres.

**PUBLIC NOTICE DATED FEBRUARY 25, 1915.**

1. Under the terms of existing public notices and orders, the operation and maintenance charges for the Umatilla project, Oregon, become due on March 1 of each year for the preceding irrigation season.

2. In pursuance of the provisions of the reclamation act of June 17, 1902 (32 Stat., 388), and acts amendatory thereof and supplemental thereto, and in particular the reclamation extension act of August 13, 1914 (38 Stat., 686), section 6 of which authorizes the Secretary of the Interior to fix the due date for operation and main-

tenance charges, notice is hereby given that until further notice there will be no change in the due date for the operation and maintenance charge for the said project.

3. Hereafter no operation and maintenance charge shall be collected at the time water-right application is filed, but the first payment on account of operation and maintenance shall become due on March 1 of the year following the calendar year in which entry was made: *Provided, however*, That if original homestead entry or original water-right application be filed after August 1 in any year, the first payment on account of operation and maintenance will not become due until March 1 of the second calendar year following the date of entry.

4. For the operation and maintenance charge due March 1, 1915, no discount will be allowed for payment prior to such date, but penalties as prescribed by the reclamation extension act will attach. As to operation and maintenance charges due March 1, 1916, and thereafter, the discount for payment made on or before the due date and the penalties for failure to make payment before the first day of the third calendar month after the due date will be applied as provided in section 6 of the said reclamation extension act, whether acceptances thereof have been filed or not.

5. The operation and maintenance charges for the irrigation season of 1915 shall be due March 1, 1916, and each acre of irrigable land, whether irrigated or not, shall be charged with a minimum operation and maintenance charge of \$1, which will permit delivery of not more than 2 acre-feet per acre. For the first acre-foot additional at the rate of 10 cents per acre-foot, 15 cents for the second, 20 cents for the third, and should further quantities be needed they will be furnished at the rate of 25 cents per acre-foot.

6. The provisions of this public notice shall apply to all lands subject to public notice heretofore issued for the said project.

7. Except as hereinabove provided, all the terms and provisions of existing public notices and orders for the Umatilla project shall remain unchanged.

A. A. JONES,  
*Acting Secretary.*

**PUBLIC NOTICE DATED APRIL 5, 1915.**

1. Pursuant to the provisions of section 4 of the reclamation act of June 17, 1902 (32 Stat., 388), and acts amendatory thereof or supplementary thereto, including the reclamation extension act of August 13, 1914 (38 Stat., 686), hereinafter referred to as the reclamation law, notice is hereby given that water will be available for the fifth unit of the Umatilla project, Oregon, in the irrigation season of 1915 for the irrigable areas shown on farm unit plat of Township 5 N., Range 29 E., Willamette Meridian, approved by the Secretary of the Interior December 23, 1913, on file at the local land office at La Grande, Oreg., and the United States Reclamation Service, Hermiston, Oreg.

2. Homestead entries, accompanied by certificate of the project manager showing that water-right application has been filed and the proper initial installment of the construction charge has been deposited as herein required, may be made at the local land office at



La Grande, Oreg., on and after May 1, 1915, beginning at 9 o'clock a. m. on said day, under the provisions of said reclamation law for the farm units shown on said plats. Water-right applications for such entries must be made to the project manager and be accompanied by the initial installment of the construction charge herein-after described.

3. Warning and notice are hereby expressly given that no person will be permitted to gain or exercise any right whatever under any settlement or occupation begun or under any filing or entry made or attempted to be made in pursuance of the provisions of the reclamation act or otherwise prior to May 1, 1915, on any land shown on said plat within the said fifth unit, and all such settlement or occupation, filing, or entry is hereby forbidden.

4. The limit of area per entry, representing the acreage which in the opinion of the Secretary of the Interior may be reasonably required for the support of a family upon the lands entered hereunder, is fixed at the amounts shown upon the plat for the several farm units.

5. The charges per acre upon the irrigable land in said fifth unit, as shown upon said plats, are fixed and established as follows: A charge of \$70 per acre for the building of the irrigation system, termed the construction charge, and an annual charge for operation and maintenance as heretofore or hereafter announced for these or other lands of the said project.

6. The construction charge shall be due and payable and be paid in installments as follows: There shall be paid into the reclamation fund at the time of making water-right application 5 per centum of such construction charge—namely \$3.50 per acre of irrigable land—as an initial installment, and the balance of said charge shall be paid in 15 annual installments, the first five of which shall be 5 per centum of the construction charge, and the remainder shall each be 7 per centum thereof, namely, \$4.90 per acre of irrigable land, until the whole amount shall have been paid, namely, \$70 per acre of irrigable land. The first of said annual installments shall become due and payable on December 1 of the fifth calendar year after the initial installment, and subsequent installments shall become due and payable on December 1 of each calendar year thereafter. Any entryman, if he so elect, may pay the whole or any part of the construction charge owing by him within any shorter period than that stated herein.

7. The operation and maintenance charge for the irrigation season of 1915 shall be due and payable on March 1, 1916, and for the irrigation season of each year thereafter shall be due and payable on March 1 thereof. The method of determining the annual operation and maintenance charge, and the penalties for failure to pay the construction charges and the operation and maintenance charges when due, and discount allowed for payment on or before the date when due of operation and maintenance charges, are prescribed by the said act of August 13, 1914 (38 Stat., 686).

8. All payments hereunder shall be made to the special fiscal agent of the Reclamation Service assigned to the project unless some other fiscal agent is designated or appointed by the Secretary of the Interior, of which due notice will be given.

A. A. JONES,  
*First Assistant Secretary.*

## FINANCIAL STATEMENTS.

*Assets, liabilities, reserves, and capital, Umatilla project, to June 30, 1915.*

## ASSETS.

Accounts receivable:	
Construction charges due and uncollected from water-right applicants.....	\$19,842.18
Construction charges unaccrued on contracts with water-right applicants.....	715,108.36
Operation and maintenance charges due and uncollected from water-right applicants.....	15,029.05
Uncollected rental of grazing lands.....	3,052.50
Total.....	\$752,832.09
Inventories:	
Animals.....	\$2,700.00
Mechanical and other equipment.....	46,473.06
Supplies and materials on hand in storehouse.....	22,208.35
Unadjusted transfers between projects.....	1 894.54
Total.....	70,486.87
Construction work in process:	
Gross expenditures for construction of project to date.....	\$1,892,870.45
Less revenue earned during construction, as follows:	
Rental of cottages.....	\$4,164.25
Rental of grazing lands.....	20,129.81
Contractors' freight refunds.....	565.22
Forfeitures by defaulting bidders....	100.00
Cunha Feed Canal contract.....	10,153.61
Profits on mess houses.....	1,648.01
Profits on mercantile stores.....	7.75
Loss on hospitals.....	1 138.04
Adjustments—	
Depreciation on plant and equipment.....	11,482.97
Total deductions.....	48,113.58
Net expenditures for construction of project to date.....	1,844,756.87
Deferred operation and maintenance charges.....	106,376.17
Total assets.....	<u>2,774,452.00</u>

## LIABILITIES, RESERVE, AND CAPITAL.

Accounts payable:	
Unpaid progress earnings under construction contracts..	\$2,406.24
Unpaid labor.....	17,719.46
Unpaid purchases.....	14,504.51
Unpaid freight and express charges.....	21,438.92
Unpaid passenger fares.....	548.75
Total.....	56,617.88
Reserves for repayment to reclamation fund of cost of project:	
Value of construction contracts with water-right applicants.....	\$781,214.48
Value of construction charges on contracts with water-right applicants temporarily suspended.....	120,865.00
Construction charges paid in advance by water-right applicants.....	27,385.33
Construction charges paid and forfeited by water-right applicants.....	1,393.72
Penalties on construction charges paid on contracts with water-right applicants.....	57.40
Total.....	930,915.93

<sup>1</sup> Deduct.

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Net investment:		
Disbursements.....	\$2, 146, 671. 79	
Transfers received from other projects.....	66, 232. 06	
	<u>\$2, 212, 903. 85</u>	
Less—		
Collections.....	332, 971. 47	
Transfers issued to other projects.....	93, 014. 19	
	<u>425, 985. 66</u>	
Total.....		<u>\$1, 786, 918. 19</u>
Total liabilities, reserves, and capital investment of the Government.....		<u>2, 774, 452. 00</u>

## *Functional feature costs of Umatilla project to June 30, 1915.*

Examination and survey.....	\$115, 125. 94
Storage system.....	798, 150. 57
Canal system.....	464, 784. 56
Lateral system.....	414, 062. 53
Drainage.....	54, 704. 48
Farm units.....	1, 758. 54
Permanent structures and lands.....	23, 618. 68
Telephone system.....	1, 341. 17
	<u>1, 873, 546. 47</u>
Accrued operation and maintenance charges and penalties compounded with construction charge.....	19, 323. 98
Gross expenditures for construction of project to date.....	<u>1, 892, 870. 45</u>

## *Operating revenues and expenses, Umatilla project, to June 30, 1915.*

### EXPENSES.

Storage system:	
Operation.....	43, 912. 87
Maintenance.....	39, 673. 47
Canal and lateral system:	
Operation.....	34, 761. 70
Maintenance.....	86, 616. 50
Drainage and flood-protection system (maintenance).....	5, 280. 50
	<u>210, 245. 04</u>
Less accrued and unpaid operation and maintenance charges and penalties compounded with construction charge.....	19, 323. 98
Total.....	<u>190, 921. 06</u>

### REVENUES.

Operation and maintenance charges accrued on contracts with water-right applicants.....	73, 125. 80
Operation and maintenance charges paid in advance by water-right applicants.....	4, 792. 62
Operation and maintenance charges paid and forfeited by water-right applicants.....	397. 03
Penalties collected on deferred operation and maintenance charges.....	92. 78
Rentals of irrigation water.....	5, 876. 54
Miscellaneous revenues.....	280. 12
Deferred operation and maintenance revenue (carried to debit side of assets and liabilities statement).....	106, 376. 17
Total.....	<u>190, 921. 06</u>

*Estimated cost of contemplated work, Umatilla project, during fiscal year 1916.*

Examination and surveys.....	\$500. 00
Canal system.....	202, 000. 00
Lateral system.....	33, 000. 00
Drainage system.....	1, 000. 00
Farm units.....	1, 000. 00
Permanent structures and land.....	2, 000. 00
Telephone system.....	1, 500. 00
Operation and maintenance, water rental.....	5, 000. 00
Operation and maintenance, public notice.....	30, 000. 00
Stores and other operations (reimbursable accounts).....	19, 000. 00
Total.....	<hr/> 295, 000. 00

## OREGON-CALIFORNIA, KLAMATH PROJECT.

J. G. CAMP, project manager, Klamath Falls, Oreg.

### LOCATION.

Counties: Klamath, Oreg.; Siskiyou and Modoc, Cal.  
Townships: 38 to 41 S., Rs. 8 to 14 E., Willamette meridian; 46 to 48 N., Rs. 1 to 8 E., Mount Diablo meridian.  
Railroad: California Northeastern.  
Railroad stations and estimated population, January 1, 1915: Klamath Falls, 5,000; Midland, 100; and Ady, Oreg.

### WATER SUPPLY.

Source of water supply: Upper Klamath Lake, Lost River, and Clear Lake.  
Area of drainage basin: 3,700 square miles.  
Annual run-off in acre-feet, 1904 to 1913: Link River at Klamath Falls (3,110 square miles)—Maximum 2,530,000; minimum, 1,450,000; mean, 1,770,000. Lost River and Willow Creek at Clear Lake—Maximum, 255,000; minimum, 35,000; mean, 125,000. Lost River at Olene and Merrill—Maximum, 475,000; minimum, 15,000; mean, 265,000.

### AGRICULTURAL AND CLIMATIC CONDITIONS.

Area for which the service is prepared to supply water, season of 1915: 40,000 acres.  
Area under water-right applications and rental contracts, season of 1915: 31,422 acres.  
Length of irrigation season: From May 1 to September 30—153 days.  
Average elevation of irrigable area: 4,100 feet above sea level.  
Average annual rainfall on irrigable area: 9 years, 14.2 inches.  
Range of temperature on irrigable area:  $-10^{\circ}$  to  $100^{\circ}$  F.  
Character of soil of irrigable area: Disintegrated basalt, volcanic ash, and diatomaceous earth, being largely classified as Yakima sandy loam.  
Principal products: Alfalfa, hay, grain, and vegetables; stock, poultry, and dairy products.  
Principal markets: Portland, Oreg.; Sacramento and San Francisco, Cal.

### LANDS OPEN FOR IRRIGATION.

Dates of public notices: November 18 and December 7, 1908; August 24, 1909; June 9, 1910; March 23 and September 24, 1914; and March 26, 1915.  
Location of lands opened: T. 38 S., R. 9 E.; 39 S., Rs. 8 to 10 E.; 40 S., Rs. 9 to 11 E.; 41 S., Rs. 10 to 12 E., Willamette meridian, and 48 N., R. 5 E., Mount Diablo meridian.  
Present status of irrigable lands opened: 44 acres entered subject to the reclamation act; 23 acres open to entry; 29,600 acres in private ownership.  
Limit of area of farm units: 160 acres.  
Duty of water, 1.8 acre-feet per acre per annum at the farm.  
Building charge per acre of irrigable land, \$30.  
Annual operation and maintenance charge, season of 1915: Minimum charge \$1.25 per acre for 2 acre-feet; 20 cents per acre-foot for first additional acre-foot and 40 cents per acre-foot thereafter.

### CHRONOLOGICAL SUMMARY.

Reconnaissance made in October and November, 1903.  
Preliminary surveys begun in 1904.  
Construction recommended by a board of engineers May 1, 1905.  
Construction authorized by Secretary May 15, 1905.  
Main canal completed August, 1907.

First irrigation by Reclamation Service season of 1907.

Keno Canal completed October, 1908.

South Branch Canal completed March, 1909.

Clear Lake Dam completed January, 1910.

Lost River Diversion Dam completed June, 1912.

Adams Canal enlargement begun October, 1913, completed April, 1914.

Second Unit lateral system begun October, 1912, completed June, 1915.

G Canal (enlargement of Griffith lateral), begun March 8, 1915, completed April 30, 1915.

Entire project 58 per cent completed June 30, 1915.

### IRRIGATION PLAN.

The irrigation plan of the Klamath project involves the utilization of Clear Lake and Upper Klamath Lake as storage reservoirs. The storage in Clear Lake, with the aid of the Lost River diversion works, recently completed, combined with evaporation from Tule Lake during the next few years, is expected to reclaim 35,000 acres of land in the bed of the northerly portion of Tule Lake. Of the 35,400 acres of land for which the service can now supply water approximately 28,000 acres lie in Oregon in a narrow strip extending 30 miles in a southeasterly direction from Klamath Falls to the California line, and receive water from the Upper Klamath Lake through the Main, South Branch, and Adams Canal system. Six thousand five hundred acres are in the second unit, and receive water from the North and South Poe Valley, Nuss Lake, and Griffith laterals, construction of which was completed in 1913. The Griffith lateral receives its water supply from Lost River.

In addition, about 600 acres of land fringing the northerly edge of Tule Lake unit are being cultivated under rental arrangements, and receive water from the Adams Canal. Water is also diverted from the Upper Klamath Lake on the west side of Link River near Klamath Falls through the Keno power canal, a little over a mile in length. It is the intention ultimately to utilize the surplus water in this canal to furnish power for pumping water, or other purposes. The United States intends, for and in connection with the project, to use the waste, seepage, spring, and percolating water arising within the same and asserts a right thereto by virtue of its reservation of all unappropriated waters of the project source of supply and of its appropriation of said waters in accordance with the State law heretofore made for the purposes of the project.

Features remaining for future attention are the development of the Tule Lake unit and extensive drainage of the first and second unit lands. In the case of the former it is quite probable that several years will elapse before a sufficiently large body of land will be uncovered by evaporation to justify extensive building operations.

In Langell and Yonna Valleys, 22,000 acres of good land embraced in the Horsefly Irrigation District can be irrigated by diversion of the waters of Miller Creek, supplemented by water from the Clear Lake Reservoir, already constructed; or by a new reservoir to be constructed on the Horsefly Reservoir site, at the headwaters of Miller Creek. In the Pine Grove District, near Klamath Falls, 3,700 acres of fine loam land can be irrigated by pumping from the Main and East Branch Canals. In Sand Hollow district 5,500 acres can be irrigated by gravity on an extension of the East Branch Canal, and 8,000 acres additional can be irrigated by pumping from the East Branch Canal. All of these tracts were included in the original estimates for the project, but land values would not justify their improvement heretofore.

### CONSTRUCTION DURING FISCAL YEAR.

*G Canal—Enlargement of Griffith Lateral.*—Owing to the demand on the South Branch Canal for water for the Van Brimmer system, heretofore supplied from Lower Klamath Lake and for lands laid bare by the recession of Tule Lake, and to extensive replacement and repairs on that canal necessary to meet these requirements, it was decided to enlarge the Griffith lateral into a carrying canal, to supply the Adams Canal and lands lying under it, the water being taken from Lost River above the Lost River Diversion Dam. This has enabled the service to discontinue the summer flow in Lost River Diversion Channel, avoiding extensive seepage. This work was begun March 8, 1915, and completed April 13, 1915, the work requiring 65,860 cubic yards of excavation by contractors and 122,137

cubic yards of excavation by Government forces. Concrete headworks and a concrete drop at the lower or southern end of the canal were built by Government forces. Both the North Poe lateral, built through shattered chalk rock on steep hillsides, and the South Poe lateral, built in shattered and honeycombed lava rock for a distance of a mile, leaked badly and required large quantities of puddling. The sublaterals were completed and banks raised on some of the former construction, so that all lands in the second unit could be furnished with water. The wooden headgate to the South Branch Canal was found to be so rotten in 1914 as to be unsafe. It was rebuilt of concrete in March, 1915.

#### **DRAINAGE.**

Drainage equipment consists of one  $\frac{1}{2}$ -cubic yard Stockton drag-line excavator, and one 1-yard Monighan drag-line excavator. These machines have worked with three shifts continuously, except that the Stockton was laid up on account of frost two weeks in January, and occasionally both machines were laid off a day for repairs. They were both stopped on June 6 to await the signing of drainage agreements by the settlers. These machines have worked on the main drain and its principal branches. A few small drains have been constructed with teams. Profiles with borings have been made of a number of lines across the valley. Mr. D. W. Murphy, engineer in charge of drainage, has made a careful study of the situation and outlined a system that will be of much benefit to the project. Work must be pushed on the drainage, as the seeped areas where drains have not been constructed is extending each year. Practically no drainage work has been done in the second unit. This should be started in the coming year before the land has become damaged. The quantity operation and maintenance charge will have some effect in limiting excessive use of water this season and much more next season.

#### **OPERATION AND MAINTENANCE.**

The first unit was operated under public notice and the second unit under rental contracts. Water was also rented for Tule Lake lands. The diversion from Klamath River in 1914 amounted to 49,250 acre-feet and from Lost River 7,500 acre-feet. It was assumed that 48 per cent was lost between the intake and the land. By cutting toe drains along the lower banks of the canal and silting some of the ditches it is hoped to reduce the damage from this source. No storage water is used for irrigation. Clear Lake Reservoir is for the purpose of keeping water out of Tule Lake, which is being reclaimed. The duty of water varies largely on this project. Part of the lands have a close texture soil several feet deep lying upon an impervious hardpan. This soil requires from 1 to  $1\frac{1}{2}$  acre-feet per acre. The other extreme is a loose sandy soil 2 to 6 feet deep resting on a porous subsoil. This soil requires from 2 to 3 acre-feet per acre. Between these two extremes are many variations of these conditions requiring various duties of water.

Better leveling of land and more intelligent methods of irrigation will lead to a higher duty of water than is feasible at present. The new method of basing operation and maintenance charges on the quantity used will be an inducement to economy. The operation

force was reorganized in 1914 and the cost of operation alone was reduced 16 per cent.

*Maintenance.*—This work consisted of a thorough cleaning out of the first unit lateral system. Many of the timber structures had become rotten and had to be replaced. Under the conditions of the extension act it was necessary to install accurate measuring devices for every farm unit. A large percentage of these have been built and the balance will be installed shortly.

*Historical review, Klamath project.*

Item.	1910	1911	1912	1913	1914	1915
Acreage for which service was prepared to supply water.	30,400	30,106	30,093	29,700	35,400	40,000
Acreage irrigated.....	27,108	23,869	23,834	18,928	24,440	.....
Number of farms irrigated.....	354	384	405	325	333	.....
Miles of canals operated.....	132	132	132	132	178	178
Water diverted (acre-feet).....	42,000	45,600	42,100	38,000	56,750	.....
Water delivered to land (acre-feet).....	23,708	20,449	23,619	22,160	26,610	.....
Per acre of land irrigated (acre-feet).....	.88	1.23	1.13	1.17	1.05	.....

<sup>1</sup> The 27,108 acres reported include all lands for which water-right applications had been made. Much of this, however, was not irrigated.

**SETTLEMENT.**

Only a few changes have been made in the last year. It is hoped that in the near future the larger holdings will be cut up into reasonable sized tracts.

There is a very efficient water users' association. Its officials have their office in the reclamation building and work in perfect harmony with the service officials.

*Settlement data, Klamath project.*

Item.	1912	1913	1914	1915
Total number of farms on project.....	430	350	373	391
Population of.....	1,100	1,125	1,375	1,530
Number of irrigated farms.....	405	325	333	352
Operated by owners or managers.....	365	259	250	247
Operated by tenants.....	40	66	83	105
Population of.....	1,028	1,060	1,300	1,425
Number of towns.....	4	4	4	4
Population of.....	5,290	5,300	4,500	4,700
Total population in towns and on farms.....	6,395	6,425	5,875	6,220
Number of public schools.....	16	16	18	19
Number of churches.....	9	9	9	9
Number of banks.....	4	3	3	3
Total capital stock.....	\$275,000	\$175,000	\$175,000	\$175,000
Total amount of deposits.....	( <sup>1</sup> )	( <sup>1</sup> )	\$1,000,000	\$1,118,500
Total number of depositors.....	( <sup>1</sup> )	( <sup>1</sup> )	2,600	3,565

<sup>1</sup> Figures not at hand; substantially as in 1914.

**PRINCIPAL CROPS.**

Hay and grain are the principal crops. Hay is alfalfa, timothy, alsike, red and white clover, redtop, and orchard grass. In the deep soils, where the water plane is not too close to the surface, alfalfa produces well. Where the hardpan or ground water is within 3 feet of the surface the shorter-rooted grasses are more of a success. Where the land is badly seeped alsike clover and redtop give good results. Owing to the high price of wheat in the spring of 1915 a large per



cent of old meadow land was plowed up and put into grain. This was a good thing, as the tendency is to use a meadow long after it is worn out.

Wheat, oats, barley, and rye are grown, and under proper conditions of irrigation give good returns, but owing to the lack of railroad transportation they are not paying crops under normal conditions. This is essentially a dairy and stock raising project. The principal crops should be hay and meadow with only as much grain as it pays to feed. Root crops for stock feed should be grown. Potatoes are uncertain, on account of frosts, which may occur as late as June 20.

Fruit and berries for home use can be raised on all parts of the project, but are liable to damage from frost except in the lower part of the project, hence are not profitable commercially.

Under conditions of normal rainfall the difference between the profits of raising grain by dry farming and by irrigation does not justify the cost of irrigation, but if the settlers desire to raise hay they can well afford to pay \$50 to \$60 per acre for water under the 20-year plan. This is a year of scant rainfall and the dry-farm crops will be a complete failure.

*Crop report of irrigated lands on Klamath project, Oregon-California, year of 1914.*

Irrigated crop.	Area (acres).	Unit of yield.	Yields.		Values.		
			Total.	Average per acre.	Per unit of yield.	Total.	Per acre.
Alfalfa.....	9,334	Tons.....	22,235	2.4	\$7.00	\$155,645	\$16.67
Barley.....	4,066	Bushels...	143,347	35.2	.45	64,508	15.86
Fruits.....	13					980	78.40
Garden.....	130					8,727	67.00
Grain hay.....	1,557	Tons.....	2,170	1.4	7.50	16,275	10.44
Mixed hay.....	842	do.....	1,419	1.7	7.00	9,933	11.80
Oats.....	2,268	Bushels...	77,031	34.0	.40	30,812	13.58
Pasture.....	4,166				3.00	12,497	3.00
Potatoes.....	461	Bushels...	28,057	61.0	.80	22,445	48.72
Rye.....	137	do.....	1,295	9.5	.75	971	7.08
Wheat.....	1,466	do.....	27,281	18.6	.90	24,553	16.75
Total acreage cropped under irrigation.	24,440		Total and average.....			347,344	14.22

*Crop report of lands dry farmed on Klamath project, Oregon-California, year of 1914.*

Crop.	Area (acres).	Unit of yield.	Yields.		Values.		
			Total.	Average per acre.	Per unit of yield.	Total.	Per acre.
Alfalfa.....	20	Tons.....	35	1.75	\$7.00	\$245	\$12.25
Barley.....	525	Bushels...	12,588	24.00	.45	5,664	10.78
Fruits.....	1					180	180.00
Garden.....	2					45	25.71
Grain hay.....	227	Tons.....	316	1.4	7.50	2,370	10.44
Mixed hay.....	20	do.....	24	1.2	7.00	168	8.40
Oats.....	737	Bushels...	16,113	21.9	.40	6,445	8.74
Pasture.....	1,251				3.00	3,753	3.00
Potatoes.....	15	Bushels...	888	59.2	.80	710	47.33
Rye.....	62	do.....	485	7.8	.75	364	5.85
Wheat.....	537	do.....	7,305	13.6	.90	6,574	12.24
Total acreage cropped by dry farming.	3,397		Total and average.....			26,518	7.80

## PUBLIC NOTICE DATED MARCH 26, 1915.

1. Under the terms of existing public notices and orders, the operation and maintenance charges for the Klamath project, Oregon-California, become due May 1 of each year, in advance.

2. In pursuance of the provisions of the reclamation act of June 17, 1902 (32 Stat., 388), and acts amendatory thereof and supplemental thereto, and in particular the reclamation extension act of August 13, 1914 (38 Stat., 686), section 6 of which authorizes the Secretary of the Interior to fix the due date for operation and maintenance charges, notice is hereby given that the operation and maintenance charges for the said project, which under existing public notices will become due on May 1, 1915, are advanced to and shall become due on March 1, 1916, and all operation and maintenance charges hereafter made against lands under the said project shall become due on March 1 of each year thereafter until further notice.

3. Hereafter no operation and maintenance charge shall be collected at the time water-right application is filed, but the first payment on account of operation and maintenance shall become due on March 1 of the year following the calendar year in which same was made: *Provided, however,* That if original homestead entry or original water-right application be filed after June 15 in any year, the first payment on account of operation and maintenance will not become due until March 1 of the second calendar year following the date of entry.

4. The discount for payment made on or before the due date and the penalties for failure to make payment before the first day of the third calendar month after the due date will be applied as provided in section 6 of the said reclamation extension act.

5. The operation and maintenance charges for the irrigation season of 1915 shall be due March 1, 1916, and each acre of irrigable land, whether irrigated or not, shall be charged with a minimum operation and maintenance charge of \$1.25, which will permit delivery of not more than 2 acre-feet of water per acre. For the first acre-foot additional a charge of 20 cents per acre-foot will be made, and should further quantities be needed they will be furnished at the rate of 40 cents per acre-foot.

6. The provisions of this public notice shall apply to all lands subject to public notice heretofore issued for the said project.

7. Except as hereinabove provided, all the terms and provisions of existing public notices and orders for the said project shall remain unchanged.

A. A. JONES,  
*First Assistant Secretary.*

## FINANCIAL STATEMENTS.

*Assets, liabilities, reserves, and capital, Klamath project, to June 30, 1915.*

## ASSETS.

## Accounts receivable:

Construction charges due and uncollected from water-right applicants.....	\$5, 187. 94
Operation and maintenance charges due and uncollected from water-right applicants.....	1, 600. 90
Construction charges on unaccrued contracts with water-right applicants.....	506, 234. 17
Uncollected water rentals.....	148. 50

Total ..... \$513, 171. 51

## Inventories:

Animals.....	\$2,604.85
Mechanical and other equipment.....	27,544.56
Material and supplies on hand in storehouse.....	14,974.94
Undistributed credit (freight and handling on inventory property).....	<sup>1</sup> 98.40
Unadjusted transfers between project.....	<sup>1</sup> 162.29

Total.....	\$44,863.66
Construction work in progress:	
Gross expenditures for construction of project to date.....	2,598,785.21
Less revenues earned during construction as follows:	
Rental of grazing lands.....	\$3,082.00
Rentals of irrigation water.....	28,350.51
Miscellaneous revenues.....	811.22
Contractors' freight refunds.....	8,555.71
Loss on mess houses.....	<sup>1</sup> 1,702.85
Profits on mercantile stores.....	808.18
Profits on hospitals.....	1,350.72
Total deductions.....	41,255.49
Net expenditures for construction on project to date.....	2,557,529.72
Deferred operation and maintenance charges.....	79,129.16
Total assets.....	<u>3,194,694.05</u>

## LIABILITIES, RESERVES, AND CAPITAL.

## Accounts payable:

Unpaid labor.....	\$5,877.24
Unpaid purchases.....	7,294.27
Unpaid freight and express.....	3,281.74
Unpaid passenger fare.....	209.65
Unpaid agreements to purchase real estate.....	2,091.20

Total.....	18,754.10
Reserves for repayment to reclamation fund of cost of project:	
Value of construction contracts with water-right applicants.....	750,406.15
Value of construction contracts with water-right applicants temporarily suspended.....	37,968.00
Construction charges paid in advance by water-right applicants.....	558.84
Construction charges paid and forfeited by water-right applicants.....	9.00
Penalties on construction charges paid by water-right applicants.....	50.97
Total.....	788,992.96
Net investment:	
Disbursements.....	2,782,672.26
Transfers received from other projects.....	76,210.32
	2,858,882.58
Less—	
Collections.....	\$440,443.60
Transfers issued to other projects.....	31,491.99
	471,935.59
Total.....	<u>2,386,946.99</u>
Total liabilities, reserves, and capital investment of the Government.....	<u>3,194,694.05</u>

<sup>1</sup> Deduct.

*Functional feature costs of Klamath project to June 30, 1915.*

Examination and surveys.....	\$109,050.74
Storage system.....	334,999.20
Canal system.....	1,580,931.50
Lateral system.....	263,363.36
Drainage system.....	124,508.35
Power system.....	128,909.12
Permanent structures and lands.....	18,661.04
Telephone system.....	26,185.87
Operation and maintenance during construction.....	12,906.08
Accrued and unpaid operation and maintenance charges and penalties compounded with construction charges.....	1,269.95
<b>Total.....</b>	<b>2,598,785.21</b>

*Operating revenues and expenses, Klamath project, to June 30, 1915.***EXPENSES.**

Canal system:	
Operation.....	\$5,119.91
Maintenance.....	9,589.67
Lateral system:	
Operation.....	19,910.34
Maintenance.....	82,721.11
Drainage system, maintenance.....	17,279.45
Undistributed expenses:	
Operation.....	30,535.15
Maintenance.....	34,365.58
<b>Total.....</b>	<b>199,521.21</b>
Less accrued and unpaid operation and maintenance charges and penalties compounded with construction charges (credit).....	<sup>1</sup> 1,269.95
Rebuilding South Branch headgates.....	2,128.02
Van Brimmer Canal headgates.....	147.63
<b>Total.....</b>	<b>200,526.91</b>

**REVENUES.**

Operation and maintenance charges accrued on contracts with water-right applicants.....	118,041.82
Operation and maintenance charges paid in advance by water-right applicants.....	866.65
Operation and maintenance charges paid and forfeited by water-right applicants.....	3.75
Rentals of irrigation water.....	2,426.00
Miscellaneous revenues.....	59.53
Deferred operation and maintenance revenues (carried to debit side of assets and liabilities statement).....	79,129.16
	<b>200,526.91</b>

*Estimated cost of contemplated work, Klamath project, for fiscal year 1916.*

Examinations and surveys.....	\$8,600.00
Canal system, East Branch chute.....	1,000.00
Lateral system, second unit laterals.....	64,554.00
Drainage system:	
First unit excavation.....	\$79,275.00
Second unit excavation.....	6,000.00
	<b>85,275.00</b>
Flood protection.....	43,171.00
Farm units, second unit.....	3,000.00

<sup>1</sup>Deduct.

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Operation and maintenance during construction:	
Development.....	\$1,400. 00
Carriage.....	1,250. 00
Distribution.....	3,975. 00
Drainage and flood protection.....	325. 00
General expense.....	3,050. 00
	<hr/>
	\$10,000. 00
Operation and maintenance under public notice:	
Carriage.....	4,680. 00
Distribution.....	22,650. 00
Drainage and flood protection.....	670. 00
General expense.....	8,000. 00
	<hr/>
	36,000. 00
Store and other operations (reimbursable accounts) .....	2,000. 00
Unallotted to features .....	9,400. 00
	<hr/>
Total.....	263,000. 00
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## **SOUTH DAKOTA, BELLE FOURCHE PROJECT.**

B. E. HAYDEN, project manager, Newell, S. Dak.

### **LOCATION.**

Counties: Butte and Meade.

Townships: 6 to 10 N., Rs. 3 to 8 E., Black Hills meridian.

Railroads: Chicago & North Western; Chicago, Burlington & Quincy; Chicago, Milwaukee & St. Paul.

Railroad stations and estimated population January 1, 1915: Belle Fourche, 1,400; Newell, 300; Nisland, 175; Fruitdale, 100.

### **WATER SUPPLY.**

Source of water supply: Belle Fourche River.

Area of drainage basin: 4,265 square miles.

Annual run-off in acre-feet: Belle Fourche River at diversion dam (4,265 square miles), 1903 to 1914—maximum, 477,150; minimum, 119,860; mean, 293,609.

### **AGRICULTURAL AND CLIMATIC CONDITIONS.**

Area for which the service is prepared to supply water, season of 1915: 78,591 acres.

Area under water-right applications, season of 1915: 51,581 acres.

Length of irrigation season: May 1 to October 1—152 days.

Average elevation of irrigable area: 2,800 feet above sea level.

Average annual rainfall on irrigable area: 8 years, 13 inches; 1914, 12.87 inches; normal year.

Range of temperature on irrigable area:  $-28^{\circ}$  to  $103^{\circ}$  F.

Character of soil of irrigable area: North side of Belle Fourche River principally heavy clay soil, with scattered areas of sandy clay loam; south side, sandy loam. All of the soils are heavy enough not to be disturbed by winds.

Principal products: Grain, corn, alfalfa, potatoes, and garden truck.

Principal markets: Omaha, Nebr.; Chicago, Ill.; and mining towns in the Black Hills.

### **LANDS OPENED FOR IRRIGATION.**

Dates of public notices, regulations, and orders relating thereto: June 21, 1907; May 29, 1908; January 18, 1909; February 19 and November 26, 1910; January 24, March 9, May 4, and December 30, 1911; February 3 and May 2, 1912; February 26, June 23, and July 21, 1913; January 19, February 26, May 29, August 14, and September 24, 1914; April 10 and May 18, 1915.

Location of lands opened: T. 7 N., Rs. 5 to 7 E.; T. 8 N., Rs. 3 to 7 E.; T. 9 N., Rs. 2 to 6 E.; T. 10 N., Rs. 3 to 6 E., Black Hills meridian.

Present status of lands opened: 26,097 acres entered subject to the reclamation act; 8,381 acres open to entry; 4,503 acres of State lands; 39,610 acres in private ownership.

Limit of area of farm units: Public, 80 acres; private, 160 acres.

Duty of water: 1.5 acre-feet per acre per annum at the farm.

Building charge per acre of irrigable land: \$30, \$35, and \$40.

Annual operation and maintenance charge: 60 cents per acre of irrigable land for 1914. For 1915, 75 cents for 1 acre-foot of water per acre; additional quantities, 60 cents per acre-foot.

### **CHRONOLOGICAL SUMMARY.**

Reconnaissance and preliminary surveys begun in 1903.

Construction recommended by board of engineers April 29, 1904.

Construction authorized by Secretary May 10, 1904.

Diversion dam and inlet canal completed September, 1907.

Belle Fourche Dam completed June, 1911.

First irrigation, season of 1908.

Entire project 91.4 per cent completed June 30, 1915.

**IRRIGATION PLAN.**

The irrigation plan of the Belle Fourche project provides for the diversion of water from the Belle Fourche River by means of a dam about 2 miles below Belle Fourche, S. Dak., and an inlet or supply canal about 7 miles in length into a storage reservoir controlled by the Belle Fourche Dam on Owl Creek, a tributary of the Belle Fourche River; the distribution of water from the inlet canal to a small area of land; and the distribution of water from the reservoir through two canal systems to lands on both sides of the Belle Fourche River.

The United States claims all waste, seepage, spring, and percolating waters arising within the project, and proposes to use such water in connection therewith.

The features of the above irrigation plan completed are the diversion dam, head-works, inlet canal, Belle Fourche storage dam, south canal and laterals, north canal to station 2127, and all tributary laterals and structures. The features not yet constructed are 3 miles of north canal and 75 miles of laterals, including Willow Creek and Nine Mile laterals, covering approximately 20,000 acres of land.

**CONSTRUCTION DURING FISCAL YEAR.**

*North canal.*—The north canal was extended  $4\frac{1}{2}$  miles, terminating at Deer Creek draw. The extension required the excavation of 74,100 cubic yards of class 1 material and the construction of the following structures: Three steel culverts, 10 steel headgates, three 40-foot timber bridges, and 1 timber check. The canal has an 18-foot bottom width and banks 8 feet high to the Deer Creek lateral; then reduces to 12-foot bottom width with banks 7 feet high.

*Lateral system.*—Fifty-seven miles of laterals, containing 209,679 cubic yards of class 1 material, have been completed. The size of laterals varied from 10-foot bottom width, with banks 6 feet high, to a 2-foot bottom width, with banks 2 feet high.

The following structures were completed: Sixteen steel headgates, five 20-foot bridges; one 18-inch tile culvert; one 18-inch tile drop; 2 concrete drops; 46 lateral turnouts (timber); 135 farm turnouts (timber); 54 lateral bridges (4 to 6 feet long); 255 timber drops (2, 3, 4, and 5 feet); 1 continuous wood stave siphon 60 inches in diameter, 1,750 feet long; 354 timber weirs; 10 timber checks.

The above canals and laterals serve an area of 10,000 acres.

**DRAINAGE.**

Aside from a series of seepage investigations no drainage work has been done on the Belle Fourche project.

The present area rendered unproductive on account of seepage approximates 2,000 acres, situated in four distinct areas known as Banana Flat, Sorensen Flat, Blair Flat, and Indian Creek Flat. The unproductive area did not increase materially during the fiscal year, although the total area affected by seepage is perhaps 30 per cent greater.

**OPERATION AND MAINTENANCE.**

During the fiscal year the first, second, and third units of the project were irrigated under public notice. A portion of the fourth unit was irrigated under rental contracts during 1914. The public notice for this unit was not issued until June 8, 1915.

During 1914 there were 49,434.92 acres covered by water-right applications and 421 acres of land under water-rental contract. There were 37,454 acres in crop and irrigated. The season was normal and was especially favorable for corn and other late crops.

During 1915 the same area is being irrigated as in 1914, together with 840 acres covered by water-right application in the fourth unit of the project. At the close of the fiscal year 51,581 acres were covered by water-right applications and 44,128 acres in crops. Storage in the Belle Fourche Reservoir on June 30 amounted to 171,660 acre-feet. Only 1,310 acre-feet of water were delivered for irrigation purposes from January 1 to June 30, owing to an exceptionally rainy season, the precipitation for this period being 13.5 inches, which is considerably above normal.

*Historical review, Belle Fourche project.*

Item.	1909	1910	1911	1912	1913	1914	1915 <sup>1</sup>
Acres for which service was prepared to supply water.....	11,923	47,568	47,568	65,852	65,852	68,852	78,591
Acres irrigated.....	5,613	15,410	19,786	27,897	32,881	37,454	2,240
Miles of canal operated.....	63	291	295	467	474	488	547
Water diverted (acre-feet).....	13,486	65,900	79,155	166,835	124,375	145,284	88,864
Water delivered to land (acre-feet).....	9,317	30,000	32,400	30,390	47,349	54,262	1,310
Per acre of land irrigated (acre-feet).....	1.66	1.95	1.64	1.10	1.44	1.46	.51

<sup>1</sup> To June 30.

NOTE.—The unusually heavy precipitation from January 1 to June 30, 1915, rendered irrigation practically unnecessary.

**SETTLEMENT.**

There has been very little increase in the number of settlers on the project during the past year. Out of 140 farm units in the fourth unit of the project, opened for entry June 8, only 30 were entered. Notwithstanding this condition, the general prosperity of the settlers shows considerable improvement over that of past years. The reasons ascribed are better market prices, more live stock, and better farming. The easy terms of payment provided by the reclamation extension act of August 13, 1914, have greatly relieved the farmer in his present obligations to the Government.

The increased value of live stock on the project for the year 1914 was \$223,475, while the increased value of crops for the same period was \$105,808.

*Settlement data, Belle Fourche project.*

Item.	1913	1914	1915 <sup>1</sup>
Total number of farms on project.....	1,292	1,292	1,310
Population of.....	2,230	2,380	2,375
Number of irrigated farms.....	637	615	653
Operated by owners or managers.....	450	401	430
Operated by tenants.....	181	214	223
Population of.....	1,575	1,724	1,800
Number of towns.....	5	5	5
Population of.....	2,025	2,050	2,060
Total population in towns and on farms, sum of.....	4,255	4,410	4,435
Number of public schools.....	23	23	23
Number of churches.....	11	11	11
Number of banks.....	10	10	9
Total capital stock.....	\$186,000	\$140,000	\$140,000
Total amount of deposits.....	\$1,000,000	\$963,549	\$1,039,386
Total number of depositors.....	3,100	3,308	3,728

<sup>1</sup> Estimated.



## PRINCIPAL CROPS.

In order of importance the principal project crops are as follows: Alfalfa, wheat, oats, corn, potatoes, and native hay. Small fruits, berries, sugar beets, and garden truck do well when properly cultivated.

During past years wheat has been the leading crop both in value and acreage, but in 1914 alfalfa took the lead and no doubt will remain the principal crop for the future.

The crop outlook for 1915 is about normal. A considerable part of the first cutting of alfalfa was spoiled by rain and the cold, damp weather has retarded the growth of corn, so that it is doubtful if all will mature. All grain crops are in excellent condition.

*Crop report, Belle Fourche project, South Dakota, year of 1914.*

Irrigated crop.	Area (acres).	Unit.	Yields.		Values.		
			Total.	Average per acre.	Per unit.	Total.	Per acre.
Alfalfa hay.....	9,745	Tons.....	20,473	2.1	\$4.50	\$92,129	\$9.46
Alfalfa seed.....	1,416	Bushels.....	3,305	2.3	7.30	23,397	16.51
Barley.....	1,448	do.....	34,718	24.0	.70	24,303	16.77
Beans.....	42	do.....	314	7.5	3.00	942	22.41
Beets, sugar.....	37	Tons.....	247	6.7	4.00	988	26.75
Clover hay.....	52	do.....	47	.9	5.00	235	4.52
Clover seed.....	9	Bushels.....	14	1.5	7.00	98	10.90
Corn.....	4,415	do.....	106,280	24.1	.70	74,396	16.85
Corn fodder.....	880	Tons.....	1,159	1.3	5.00	5,804	6.61
Garden.....	159	do.....				8,036	50.55
Hay.....	2,236	Tons.....	1,911	.9	19.00	19,110	8.55
Millet seed.....	58	Bushels.....	889	15.3	1.00	889	15.32
Oats.....	6,392	do.....	209,813	32.8	.40	83,925	13.12
Pasture.....	3,604	do.....				12,078	3.35
Potatoes.....	195	Bushels.....	19,796	101.5	.80	15,837	81.15
Rye.....	14	do.....	244	17.4	.90	220	15.71
Wheat.....	7,885	do.....	108,880	13.8	.90	97,992	12.41
Miscellaneous <sup>1</sup> .....	45	do.....				809	17.98
Less duplicated areas.....	1,923						
Total cropped acreage.....	36,709	Total and average.....				461,188	12.56
Irrigated, not cropped:							
With nurse crop.....	4,301						
Young alfalfa without nurse crop.....	639						
Orchard.....	91						
Miscellaneous.....	15						
Less duplicated areas.....	4,301						
Grand total irrigated.....	37,454						

Areas.	Acres.	Farms.	Per cent of pro- ject. <sup>2</sup>
Total irrigable area farms reported.....	49,426	615	49.4
Total irrigated area farms reported.....	37,454	615	37.4
Under water-right applications.....	37,033	598	37.0
Under rental contracts.....	421	17	.4
Total cropped area farms reported.....	36,709	615	36.7

<sup>1</sup> Includes 375 bushels of "Billion Dollar" grass seed, at 88 cents.

<sup>2</sup> Based on 100,000 acres.

## PUBLIC NOTICE DATED APRIL 10, 1915.

1. Under the terms of existing public notices and orders, the operation and maintenance charges for the Belle Fourche project, South Dakota, become due on December 1 of each year and are payable in advance of the irrigation season.

2. In pursuance of the provisions of the reclamation act of June 17, 1902 (32 Stat., 388), and acts amendatory thereof and supplemental thereto, and in particular the reclamation extension act of August 13, 1914 (38 Stat., 686), section 6 of which authorizes the Secretary of the Interior to fix the due date for operation and maintenance charges, notice is hereby given that the operation and maintenance charges for the said project, which under existing public notices become due December 1, 1915, are postponed to and shall become due on March 1, 1916, and all operation and maintenance charges hereafter made against lands under the said project shall become due on March 1 of each year thereafter until further notice.

3. Hereafter no operation and maintenance charge shall be collected at the time water-right application is filed, but the first payment on account of operation and maintenance shall become due on March 1 of the year following the calendar year in which the entry or water-right application was filed; provided, however, that if original homestead entry or water-right application be filed after June 15 in any year, the first payment on account of operation and maintenance will not become due until March 1 of the second calendar year following the date of entry.

4. The discount for payment made on or before the due date and the penalties for failure to make payment before the first day of the third calendar month after the due date will be applied as provided in section 6 of the said reclamation extension act.

5. The operation and maintenance charges for the irrigation season of 1915 shall be due March 1, 1916, and each acre of irrigable land, whether irrigated or not, shall be charged with a minimum operation and maintenance charge of 75 cents, which will permit delivery of not more than 1 acre-foot per acre. Should further quantities be needed, they will be furnished at the rate of 60 cents per acre-foot.

6. The provisions of this public notice shall apply to all lands subject to public notice heretofore issued for the said project.

7. Except as hereinabove provided, all the terms and provisions of existing public notices and orders for the Belle Fourche project shall remain unchanged.

A. A. JONES,  
*First Assistant Secretary.*

**PUBLIC NOTICE DATED MAY 18, 1915.**

1. In pursuance of the provisions of section 4 of the reclamation act of June 17, 1902 (32 Stat., 388), and acts amendatory thereof and supplemental thereto, and particularly the reclamation extension act of August 13, 1914 (38 Stat., 686), notice is hereby given that water will be furnished under the Belle Fourche project, South Dakota, in the irrigation season of 1915 and thereafter for the irrigable lands of the fourth unit shown on the farm unit plats of Black Hills meridian—T. 9 N., R. 5 E.; T. 8 N., R. 6 E.; T. 9 N., R. 6 E.; T. 10 N., R. 6 E.; T. 8 N., R. 7 E.—approved by the Secretary of the Interior on May 3, 1915, and on file at the local land office at Belle Fourche, S. Dak., and at the office of the project manager at Newell, S. Dak.

2. Homestead entries of the farm units shown on said plats embracing public lands of the United States may be made on and after June 8, 1915, at 9 o'clock a. m., at the local land office at Belle Fourche,

S. Dak., if found regular and accompanied by the certificate of the project manager showing that water-right application has been filed and the proper water-right charges deposited.

3. Warning is hereby expressly given that no person will be permitted to gain or exercise any right whatever under any settlement or occupation begun prior to 9 a. m., June 8, 1915, on any lands shown on said plats: *Provided, however*, That this shall not interfere with any valid existing rights obtained by settlement or entry while the land was subject thereto.

4. The limit of area per entry representing the acreage which, in the opinion of the Secretary of the Interior, may be reasonably required for the support of a family upon such lands is fixed at the amounts shown upon the plats for the several farm units. Water-right applications for lands in private ownership may be made on and after the date of this notice. All water-right applications, whether for public or private lands, must be made to the project manager, U. S. Reclamation Service, Newell, S. Dak. The maximum limit of area for which water-right application may be made for lands in private ownership shall be 160 acres of irrigable land for each landowner, and no application will be accepted from any landowner whose irrigable area, shown on these plats, plus any other land of the applicant irrigable from the said project, shall exceed 160 acres of irrigable land unless payment in full of the construction charge has been made for such other irrigable lands.

5. The water-right charges per acre of irrigable land are of two kinds: (a) A charge, as hereinafter provided, for the building of the irrigation system termed the construction charge; and (b) an annual charge for operation and maintenance due and payable March 1 of each year for the preceding irrigation season. The operation and maintenance charge for the irrigation season of 1915 shall be due on March 1, 1916, and shall be of the amount in effect for other lands of the project in the irrigation season of 1915. The operation and maintenance charges for future years will be duly announced.

6. For homestead entries made after August 13, 1914, and land in private ownership, which after August 13, 1914, is signed under contract with the Belle Fourche Valley Water Users' Association, water-right applications will be accepted at a construction charge of \$40 per acre of irrigable land. A payment of \$2 per irrigable acre must be made at time of entry or filing water-right application, which application must be on the form provided under the reclamation extension act. The remainder of the construction charge—to wit, \$38 per irrigable acre—must be paid in 15 annual installments, the first 5 of which shall be \$2 each and the remaining installments \$2.80 each per irrigable acre. The first annual installment becomes due December 1 of the fifth calendar year after the year in which the initial payment is due. The subsequent installments become due on December 1 of each calendar year thereafter.

7. In all cases where water-right application for lands in private ownership or for lands under entries not subject to the reclamation act shall not be made within one year from the date of this notice the construction charge for such land shall be increased 5 per centum each year until water-right application and an initial payment are made.

8. In accordance with contract of January 24, 1911, between the Secretary of the Interior and the Belle Fourche Valley Water Users'

Association, lands entered or held under trust deed or signed under contract with the Belle Fourche Valley Water Users' Association before January 24, 1911, shall be subject to a construction charge of \$30 per acre of irrigable land shown on said plats, payable in 10 annual installments, graduated as follows: First installment, \$1 per acre; second installment, \$2 per acre; third to eighth installments, inclusive, \$3 per acre each; ninth installment, \$4 per acre; tenth installment, \$5 per acre. The first installment shall become due on December 1, 1915, and subsequent installments shall become due on December 1 of each year thereafter: *Provided, however,* That if water-right application subject to the provisions of the reclamation extension act of August 13, 1914, is filed by the applicant within six months of the date of this notice it will be accepted at a construction charge of \$30 per acre of irrigable land, divided into 20 annual installments, the first of which shall become due and payable on December 1, 1915, and subsequent installments on December 1 of each year thereafter. The first four of such installments shall each be 2 per centum or 60 cents per acre, the next two installments shall each be 4 per centum or \$1.20 per acre, and the next 14 installments 6 per centum or \$1.80 per acre of irrigable land.

9. In case of failure to file water-right application for lands described in paragraph 8 within two years from the date of this notice such lands shall be subject to the construction charge and conditions imposed upon lands referred to in paragraph 10 in addition to the penalties prescribed by the reclamation extension act. Failure to file within one year shall cause to be effective the penalties prescribed by the reclamation extension act, and failure to file within two years shall cause to accrue additional penalties thereunder in addition to the increased construction charge provided in paragraph 10 hereof.

10. For lands held under trust deed or signed under contract with the Belle Fourche Valley Water Users' Association after January 24, 1911, and on or before August 13, 1914, the construction charge shall be \$40 per irrigable acre plus the penalties accrued under the provisions of the reclamation extension act, payable in 10 annual installments and graduated as follows: First and second installments, \$2 each per acre; third and fourth installments, \$3 each per acre; fifth and sixth installments, \$4 each per acre; seventh and eighth installments, \$5 each per acre; ninth and tenth installments, \$6 each per acre. The first installment shall become due December 1, 1915, and subsequent installments shall become due on December 1 of each year thereafter.

11. If, however, water-right applications under the provisions of the reclamation extension act or formal acceptances thereof are filed for the lands described in paragraph 10 hereof within six months of the date of this notice, such water-right applications will be accepted at a construction charge of \$40 per acre of irrigable land, divided into 20 annual installments, the first of which shall become due on December 1, 1915, and subsequent installments on December 1 of each year thereafter. The first 4 of such installments shall be 80 cents per acre each, the next 2 installments shall be \$1.60 per acre each, and the next 14 installments \$2.40 per acre each.

Bo SWEENEY, *Assistant Secretary.*

**FINANCIAL STATEMENTS.***Assets, liabilities, reserves, and capital, Belle Fourche project, to June 30, 1915.***ASSETS.**

Cash with employees for transfer to special fiscal agent.....		\$3. 55
Accounts receivable:		
Construction charges due and uncollected from water-right applicants.....	\$113, 500. 52	
Construction charges unaccrued on contracts with water-right applicants.....	1, 378, 067. 16	
Operation and maintenance charges due and uncollected from water-right applicants.....	19, 005. 29	
Uncollected miscellaneous.....	49. 20	
Total.....		1, 510, 622. 17
Inventories:		
Mercantile store stock on hand.....	12. 15	
Government animals.....	6, 210. 00	
Mechanical and other equipment.....	22, 337. 03	
Material and supplies on hand in storehouses.....	17, 782. 89	
Total.....		46, 342. 07
Construction work in process:		
Gross expenditure for construction of project to date.....	3, 326, 325. 33	
Less revenue earned during construction as follows:		
Rental of buildings.....	\$3, 544. 08	
Rental of grazing and farm lands.....	2, 350. 30	
Rental of telephones.....	87. 03	
Contractors' freight refunds.....	2, 616. 22	
Forfeitures by defaulting bidders and contractors.....	7, 337. 50	
Sale of town-site lots.....	54, 792. 33	
Miscellaneous building revenues.....	45. 00	
Loss on mess houses.....	<sup>1</sup> 4, 014. 71	
Profit on mercantile stores.....	1, 598. 44	
Profit on hospital.....	1, 896. 53	
Adjustments—		
Profits shown on Government animals.....	6, 743. 72	
Estimated equipment depreciation.....	2, 417. 31	
Estimated Government animal depreciation.....	1, 404. 42	
Total deductions.....	80, 818. 17	
Net expenditure for construction of project to date.....	3, 245, 507. 16	
Deferred operation and maintenance charges.....	164, 141. 97	
Total assets.....		<u>4, 966, 616. 92</u>

**LIABILITIES, RESERVES, AND CAPITAL.**

Accounts payable:		
Unpaid progress earnings under construction contracts.....	\$7, 025. 62	
Unpaid contract holdbacks.....	1, 322. 00	
Unpaid labor.....	7, 565. 97	
Unpaid purchases.....	7, 269. 42	
Unpaid freight and express.....	5, 126. 48	
Unpaid passenger fares.....	109. 00	
Total.....		<u>\$28, 418. 49</u>

<sup>1</sup> Deduct.

## Reserves for repayment to reclamation fund of cost of project:

Value of construction contracts with water-right applicants.....	\$1, 589, 475. 94	
Value of construction contracts with water-right applicants temporarily suspended.....	31, 580. 40	
Construction charges paid in advance by water-right applicants.....	3, 340. 80	
Construction charges paid and forfeited by water-right applicants.....	533. 04	
Penalties on construction water-right charges paid by water-right applicants.....	384. 41	
Total.....		\$1, 625, 314. 59
Net investment:		
Disbursements.....	\$3, 587, 115. 57	
Transfers received from other projects.....	91, 106. 19	
		3, 678, 221. 76
Less—		
Collections.....	327, 411. 70	
Collections, refund repayments.....	265. 87	
Transfers issued to other projects.....	37, 660. 35	
		365, 337. 92
Total.....		3, 312, 883. 84
Total liabilities, reserves, and capital investment of the Government.....		4, 966, 616. 92

*Functional feature costs of Belle Fourche project to June 30, 1915.*

Examination and surveys.....	\$806. 09
Storage system.....	1, 684, 625. 05
Canal system.....	956, 211. 90
Lateral system.....	568, 552. 70
Drainage system.....	787. 21
Farm units.....	5, 357. 79
Permanent structures.....	88, 361. 14
Telephone system.....	14, 057. 98
Undistributed general expense.....	4, 283. 99
Town-site developments.....	2, 504. 21
Stores and other operations.....	777. 27
Gross expenditures for construction of project to date.....	3, 326, 325. 33

*Operating revenues and expenses, Belle Fourche project, to June 30, 1915.*

## EXPENSES.

Storage system:	
Operation.....	\$11, 352. 96
Maintenance.....	41, 981. 46
Canal system:	
Operation.....	16, 282. 46
Maintenance.....	56, 739. 99
Lateral system:	
Operation.....	30, 003. 35
Maintenance.....	124, 395. 50
Drainage and flood protection system—Maintenance.....	3, 619. 60
Undistributed expense:	
Operation.....	1, 035. 38
Maintenance.....	6, 724. 91
Total.....	292, 135. 61

## REVENUES.

Operation and maintenance charges accrued on contracts with water-right applicants.....	\$125, 539. 03
Operation and maintenance charges paid in advance by water-right applicants.....	117. 05
Operation and maintenance charges paid and forfeited by water-right applicants.....	180. 40
Penalties for deferred payments of operation and maintenance water-right charges.....	189. 47
Rentals of buildings.....	285. 00
Rentals of irrigation water.....	1, 664. 14
Miscellaneous operation and maintenance revenues.....	18. 55
Deferred operation and maintenance revenues (carried to debit side of assets and liabilities statement).....	164, 141. 97
Total.....	<u>292, 135. 61</u>

*Estimated cost of contemplated work, Belle Fourche project, during fiscal year 1916.*

Examination and surveys.....	\$33, 500. 00
Canal system.....	36, 327. 00
Lateral system.....	29, 558. 00
Farm units.....	250. 00
Permanent improvements and lands.....	4, 800. 00
Telephone system.....	200. 00
Operation and maintenance under public notice.....	63, 705. 00
Stores and other operations (reimbursable accounts).....	5, 660. 00
Total.....	<u>144, 000. 00</u>

## **UTAH, STRAWBERRY VALLEY PROJECT.**

J. L. LYTEL, project manager, Provo, Utah.

### **LOCATION.**

Counties: Utah and Wasatch.  
Townships: 8 and 9 S., Rs. 1 to 3 E., Salt Lake base and meridian.  
Railroads: Denver & Rio Grande; San Pedro, Los Angeles & Salt Lake.  
Railroad stations and estimated population: Payson, 3,000; Spanish Fork, 3,600; Springville, 3,700..

### **WATER SUPPLY.**

Source of water supply: Strawberry and Spanish Fork Rivers and a number of small streams and springs not on the watersheds of these two. Contemplated pumping plants.

Area of drainage basins: Strawberry River, including Indian and Trail Hollow Creeks, 175 square miles; Spanish Fork River, 670 square miles.

Annual run-off in acre-feet: Strawberry River in Strawberry Valley, including Indian and Trail Hollow Creeks, 1903-1906 and 1909-1914, maximum, 150,000; minimum, 49,000; mean, 80,000. Spanish Fork River at Spanish Fork, 1903-1914, maximum, 227,000; minimum, 65,000; mean, 119,000.

### **AGRICULTURAL AND CLIMATIC CONDITIONS.**

Area for which the service is prepared to supply water during the season of 1915: 20,000 acres; 206,000 acre-feet available in reservoir.

Length of irrigating season: April 15 to September 30—169 days.

Average elevation of irrigable area: 4,600 feet above sea level.

Average annual rainfall: 18 inches; at Payson (6 years), 20.14 inches; at Provo (18 years), 14 inches; 1914, 16.91 inches.

Range of temperature on irrigable area:  $-10^{\circ}$  to  $95^{\circ}$  F.; mean temperature at Provo,  $49.3^{\circ}$  F.

Character of soil of irrigable area: Sandy loam, heavy clay, and varying mixture of both; black alluvium; loam; and gravel. Much of the soil is underlaid by a coarse gravel, and the natural drainage is excellent.

Principal products: Alfalfa, hay, cereals, sugar beets, fruits, vegetables.

Principal markets: Salt Lake City, Utah, and adjacent towns and mining districts.

### **LANDS OPENED FOR IRRIGATION.**

No lands have been opened for irrigation by public notice.

### **CHRONOLOGICAL SUMMARY.**

Reconnaissance and preliminary surveys begun in 1903.  
Construction recommended by board of engineers October 2, 1905.  
Construction authorized by Secretary December 15, 1905.  
Excavation of tunnel completed June 20, 1912.  
Storing of water in Strawberry Reservoir begun July 14, 1912.  
Construction of Indian Creek Dike completed September, 1912.  
Strawberry Tunnel formally opened September 13, 1913.  
Construction of Strawberry Dam completed September 20, 1913.  
Construction started on High Line Canal, January, 1915.  
First storage water used for irrigation, June 27, 1915.  
Entire project 81 per cent completed June 30, 1915.



### IRRIGATION PLAN.

The irrigation plan of the Strawberry Valley project provides for the storage of water in a reservoir on Strawberry River; the discharge of the stored water through the Strawberry Tunnel, approximately  $3\frac{1}{4}$  miles long, into Diamond Fork, a tributary of Spanish Fork River; and the diversion of water from Spanish Fork River into canal systems, watering lands east and south of Utah Lake. A hydroelectric plant on the south side of the river  $3\frac{1}{4}$  miles below the diversion dam supplies power for construction and commercial purposes. Part of the power developed will ultimately be used for pumping water for irrigation of high lands and drainage of low lands. The United States claims all waste, seepage, unappropriated spring and percolating water arising within the project, and proposes to use such water in connection therewith.

On the High Line unit, where an area of 25,000 acres, the greater part of which at present has no water right, will be irrigated, a complete canal system will be constructed by the United States, and on the Spanish Fork and Lake Shore units, where a supplemental supply will be furnished for a large acreage, the present canal system will be used, with such enlargements and additions as may be necessary to be made by the canal companies, to supply additional land under these systems with water.

The completed features of the irrigation plan are: Diversion Dam on Spanish Fork River; power canal, the first unit of the hydroelectric power plant on Spanish Fork River; Strawberry Tunnel, through the rim of the Great Basin; 40 per cent of the canal system on the High Line unit; and the following features in connection with the Strawberry Reservoir: Strawberry Dam, Indian Creek Dike, Indian Creek and Trail Hollow diversion canals and appurtenant structures, East Portal permanent camp. In connection with the construction of these features, 55 miles of wagon road, 44 miles of telephone lines, and 49.5 miles of high tension power transmission lines have been built. Power from the United States Reclamation Service power house is being supplied to Payson, Salem, and Spanish Fork for lighting and other purposes, the Reclamation Service having built the high tension lines from its power house to these towns. The towns built their own substations and distribution lines.

In accordance with the present plans, the construction work remaining to be done on the project consists of the completion of the main High Line Canal and lateral system, and such minor structures and supplemental construction on the storage works and power canal as may be found necessary; also the Mapleton lateral may be constructed in case the landowners under that unit sign up enough land to warrant the expenditure. No construction work will be done on the Spanish Fork or Lake Shore units, as the contracts with the canal companies on these units provide that the water from the project shall be delivered to the head of the several existing canals, and the companies shall deliver it from this point to the land.

### CONSTRUCTION DURING FISCAL YEAR.

*Roads and bridges.*—In the Strawberry Valley approximately 12 miles of mountain road were constructed for the purpose of facilitating the maintenance and operation work in connection with the several structures connected with the storage works. On Diamond Fork Creek four light wagon bridges were constructed for the purpose of enabling the landowners along this stream to cross when large quantities of storage water were being turned down Diamond Fork for irrigation purposes. Also, near the west portal of the Strawberry Tunnel, one-half mile of the Diamond Fork Road was rebuilt at a location higher up the mountain side to prevent the road from being washed out by the storage water from the tunnel.

*Rating flume.*—A reinforced concrete rating flume 20 feet wide and 150 feet long was constructed at milepost 20 on the Diamond Fork Road 2 miles below the west portal of the Strawberry Tunnel to provide accurate means of measuring the storage water turned out of the Strawberry Reservoir.

*Power canal covering.*—Near milepost 1 on the power canal, 1,024 feet of the canal were covered, partly with a reinforced concrete arch covering and partly with reinforced concrete girder and slab, to prevent the canal from being filled with rock from the disintegrating

rock slopes and from being filled with débris from a snowslide that runs in Garfield Canyon from about 3 miles up the mountain side and crosses the canal near this point.

*High Line Canal and laterals.*—Construction work on this feature was commenced about the middle of the fiscal year by contract, and on June 30 bids on 9 divisions had been opened. The contractors on the divisions that had been let were making good progress, as labor conditions in general have been very favorable. The main canal on this unit is  $17\frac{1}{2}$  miles long and the laterals about 70 miles, the capacity of the main canal being 300 second-feet at its head and the laterals varying from 6 to 70 second-feet. On account of the nature of the soil traversed by the main canal and laterals, almost 5 miles of the main canal and practically all of the lateral system are being lined with concrete to prevent excessive loss from seepage in transmission. On June 30 work on the main High Line Canal was about 50 per cent completed and on the lateral system the contractors had commenced work on divisions 7 and 8. The total force employed by the contractors was about 800 men and 400 head of stock; and the Government forces, including engineers and inspectors, comprised about 125 men and 30 head of horses.

#### **POWER PLANT, POWER CANAL, AND TRANSMISSION LINES.**

These features were operated practically without interruption, and power was supplied under contract to Payson, Salem, and Spanish Fork. The load on the plant has been rather light during the year, due to the fact that no other sales of power were considered desirable until after the irrigation water that has been developed by the project has been disposed of and it is known what quantity of water from storage can be used in the development of power.

#### **OPERATION AND MAINTENANCE DURING CONSTRUCTION.**

The several completed features in the vicinity of the storage works and the power canal were operated without any unusual trouble - one ditch rider and one gate tender taking care of the storage works and one ditch rider taking care of the Spanish Fork Diversion Dam and power canal. On June 30 there were 206,000 acre-feet of water stored in the Strawberry Reservoir. On June 27, 1915, the delivery of stored water from the reservoir to the East Bench and Lake Shore Canals on the Spanish Fork unit was commenced.

#### **SURVEYS AND INVESTIGATIONS.**

Hydrographic work was carried on for the purpose of keeping up the record of the flow of all the streams that in any way are connected with the water supply for the project. Forty gauging stations were maintained and approximately 550 meter measurements made.

The final location of the Mapleton lateral and the main High Line Canal, together with the lateral system, was completed, and the plans and specifications covering the construction of all the canals on the High Line unit were prepared and printed. Seven hundred and sixty-five water-right applications were received and the necessary engineering and legal work done in connection with classifying lands, investigating descriptions and titles, and locating boundary lines of the different units.

**SEEPAGE AND DRAINAGE.**

No work was done on this feature except to secure considerable data for the purpose of platting the map showing the elevation of the underground water plane on the different units.

**WATER USERS' ASSOCIATION.**

Since the contract between the Secretary of the Interior and the Strawberry Valley water users was abrogated by the Secretary on March 5, 1914, negotiations have been carried on with committees elected by the people on the High Line and Mapleton units, and with the president and board of directors of the different canals on the Spanish Fork and Lake Shore units.

*High Line unit.*—On this unit water-right applications have been accepted and placed of record covering 16,000 acres of irrigable land. On account of the water-right applications having been signed and the land thereby made subject to the reclamation extension act previous to the passage of the reclamation extension act, no payments were made in connection with these applications. Four hundred and thirty-one applications have been accepted on this unit, a great deal of engineering and legal work being necessary in connection with the examination of abstracts, platting of descriptions, and straightening out titles. On account of the area that was signed up in the applications having been settled on from 25 to 50 years ago, a great deal of work was necessary in many instances to straighten out the titles. The form of water right application is as follows:

Approved by Secretary  
February 24, 1914.

High Line Unit  
Strawberry Valley Project.

Form B

Department of the Interior.—Water-right application for lands in private ownership and lands other than homesteads under the reclamation act.

Act June 17, 1902 (32 Stat., 388); act Aug. 9, 1912 (37 Stat., 265).

Strawberry Valley project. Serial No. .... State of Utah. High line unit.

(Date.)

1. I, ....., in pursuance of the provisions of the reclamation act approved June 17, 1902 (32 Stat., 388), and acts amendatory thereof, and supplementary thereto, especially the act approved August 9, 1912 (37 Stat., 265), all hereinafter called the reclamation law and the rules and regulations established thereunder, do hereby apply for a water right for the irrigation of and to be appurtenant to the irrigable land as shown on plats to be approved by the Secretary of the Interior within the tract described as follows:

.....  
.....  
..... section .....  
township ..... range .....  
..... meridian, containing a total area of ..... acres.

2. The quantitative measure of the water right hereby applied for is that quantity of water which shall be beneficially used for the irrigation of said irrigable lands up to, but not exceeding two (2) acre-feet per acre per annum, measured at the head of the High Line Canal; and in no case exceeding the share, proportionate to irrigable acreage, of the water supply actually available as determined by the project manager or other proper officer of the United States or of its successors in the control of the project, during the irrigation season for the irrigation of lands under said unit. The applicant assumes all risk of loss in transporting the water from the point of delivery to the said lands.

3. I, on behalf of myself, my heirs, executors, administrators, and assigns, hereby promise, covenant, and agree (a) to pay promptly when due each and every one of the annual installments of the building charge fixed by the Secretary of the Interior in public notice to be issued in connection with the unit above described, being \$80 per acre of irrigable land, payable in installments graduated substantially as follows: \$1, \$2, \$3, \$4, \$5, \$5, \$5, \$5, \$5, and the balance in the tenth year, subject to any extensions made applicable by future statutes, and in addition thereto each and every annual charge for operation and maintenance, including any and all expense due to the exercise by the United States, or its successors in control of said unit, of the right reserved in paragraph 7 to secure proper delivery of water to individual water-right applicants under said unit, and each and every charge for betterments as fixed from time to time by the Secretary of the Interior, or the proper officer of the successors of the United States in the control of the project; (b) that each and all of the annual installments of the building charge, and each and all of said annual charges for operation and maintenance, and each and all of said charges for betterments shall be and the same are hereby made a lien upon the tract of land above described, and all water rights now or hereafter appurtenant or belonging thereto and all improvements now existing or hereafter made thereon, for myself, my heirs, executors, administrators, and assigns promising, covenanting, and agreeing to pay all taxes and other claims now or hereafter becoming a prior encumbrance, failing which, upon demand by any proper officer of the United States or its successors in control of said project, the United States or its said successors may pay the same and add the amount thereof to the lien hereby created and recover the amount so paid as part of the said lien.

4. Upon my failure to comply with the terms of the reclamation law and the regulations thereunder, this application may, in the discretion of the Secretary of the Interior, be canceled by him with the forfeiture of all rights under the reclamation law and of all moneys theretofore paid hereon, excepting, however, from the force and effect of this paragraph any and every failure to make payments which shall become due and payable after the issuance of final certificate for the water right hereby sought under the reclamation law, a remedy for the failure thus excepted having been provided by said law.

5. This application must bear the certificate, as hereto attached, of the water users' association under said project, which has entered into contract with the Secretary of the Interior, and the liens which the United States holds against the above-described land for the payment of the building and betterment and operation and maintenance charges, may be enforced, at the option of the United States, either directly by the United States, or, where such lien was given directly to the water users' association for the benefit of the United States, may be enforced through the medium of the water users' association, but the election of one remedy shall not preclude the United States from following the other. If the Secretary of the Interior has made no contract with a water users' association under said project, the applicant agrees to file, upon his direction, evidence of membership in the water users' association organized under the said project, in default of which this application shall be subject to cancellation by the Secretary of the Interior, with the forfeiture of all rights acquired thereunder and of all payments made thereon.

6. And I further promise, covenant, and agree for myself, my heirs, executors, administrators, and assigns that if any freehold interest in said tract shall, through the voluntary act of me or them, be acquired by any person not qualified by the reclamation law to purchase the water right hereby sought, this application and any such freehold interest shall be subject to forfeiture as provided by said law.

7. It is understood that at their own expense the water users under said unit are to operate and maintain the High Line Canal and distributing system, and deliver water to the lands thereunder, but there is reserved the right to the United States to secure proper deliveries of water to each individual water-right applicant at the expense of the water users of said unit in case of failure to provide for proper distribution, and I hereby promise, covenant, and agree for myself, my heirs, executors, administrators, and assigns that the United States and its successors in charge of the said unit may assume full control over all ditches, gates, and other structures owned or controlled by the applicant or his successors in interest and which may be required to secure proper delivery of water to any individual water-right applicant; and proper officers and employees of the United States and its successors shall have at all times the right of access to the above-described premises whenever it is, in the judgment of the officer or employee in charge of said unit, necessary for them to secure such delivery of water to exercise said control. And I for myself, my heirs, executors, administrators, and assigns do hereby give, grant, bargain, sell, and convey to the United States and its said successors the right for any such proper officer or

employee to go and come upon any and all lands now or hereafter owned or held by me or them for said purpose and there exercise said control.

8. It is understood and agreed that the United States reserves the right upon my failure or the failure of my successors in interest to keep and perform any of the provisions in this instrument contained, by me and my successors in interest undertaken to be kept and performed, to refuse to deliver water to said lands or to stop the delivery of water thereto if water is being delivered, and such refusal to deliver or stoppage of delivery of water shall not operate to cancel this application, but shall be considered as an additional remedy to the United States to any remedies existing by reason of the provisions of this application or otherwise.

9. And I for myself, heirs, executors, administrators, and assigns do hereby grant, bargain, sell, convey, and confirm to the United States of America and its successors in charge of the project, all rights of way for ditches, canals, flumes, pipe lines, telegraph and telephone transmission lines, or other structures, now constructed by or under the authority of the United States for or in connection with the said project, and all rights of way that may be or become necessary and suitable and that may be required for the prosecution and operation of the said project, and for the construction, maintenance, and operation of ditches, canals, flumes, pipe lines, telegraph and telephone transmission lines, or other structures that may be constructed by or under authority of the United States and its successors in charge of the project for and in connection with said project, excepting, however, the right of way required for the construction of the main canal of the project, not including its laterals, to have and hold the same, together with all the tenements, hereditaments, privileges, and appurtenances thereunto belonging or in any wise appertaining to the United States of America and its assigns and successors in charge of the project forever, subject notwithstanding to the conditions upon which this application is made. And I furthermore, for myself, heirs, executors, administrators, and assigns, do hereby convey, quitclaim, and release unto the United States of America and its successors in charge of the project the right to take, appropriate, and use all seepage and waste water arising or flowing from said described land.

10. No Member of or Delegate to Congress or Resident Commissioner, after his election or appointment or either before or after he has qualified and during his continuance in office, shall be admitted to any share or part of this contract or agreement, or to any benefit to arise thereupon. Nothing, however, herein contained shall be construed to extend to any incorporated company where such contract or agreement is made for the general benefit of such corporation or company, as provided in section 116 of the act of Congress approved March 4, 1909. (35 Stat., 1109.)

11. And I, the said ..... , being duly sworn, depose and say that my post-office address is ..... ; that I am a bona fide resident upon said land (or occupant thereof, residing in the neighborhood, namely, upon section ..... , township ..... , range ..... meridian, a distance in a direct line of ..... miles therefrom); that I hold the following interest in the said tract: ..... as duly shown upon the records of ..... County, ..... in volume (liber) ..... , at page (folio) ..... ; that no other application now uncanceled has been made for a water right under the reclamation law appurtenant to land now owned or claimed by me, except as follows:

Application No. .... project, of ..... for ..... section ..... , township ..... , range ..... meridian an area of ..... acres and containing ..... acres of irrigable land, as determined by the Secretary of the Interior; and that the present application is made in my own behalf and not at the instance or for the benefit of any other person or any association or corporation, either directly or indirectly.

12. Nothing in this application contained shall be construed as in any manner or at all abridging, limiting, or depriving the United States of any means of enforcing any remedy in law or equity for the breach of any of the provisions of this application which it would otherwise have.

In witness whereof I, ..... have hereunto set my hand and seal this ..... day of ..... 191...

..... [SEAL.]  
..... [SEAL.]  
In presence of:  
(Three witnesses must sign here.)  
.....  
.....  
.....

*Spanish Fork unit.*—This unit is made up of about 31,000 acres of land located on both sides of the Spanish Fork River in the vicinity of the town of Spanish Fork. The greater part of this area has a flood-water right from the Spanish Fork River and is irrigated by four existing canals, and during March and April contracts were entered into with them as follows:

Spanish Fork East Bench Irrigation & Manufacturing Co., March 25, 1915.

Spanish Fork South Field Irrigation Co., March 25, 1915.

Spanish Fork Southeast Irrigation Co., April 25, 1915.

Spanish Fork West Field Irrigation Co., March 25, 1915.

In these contracts they agreed to deliver through their canal system any water that might be sold from the Strawberry Valley project to lands that could be irrigated from their canals, a reasonable charge to be made for such carriage and such extension of the system as might be necessary, due to the delivery of this water. On March 17 the Secretary of the Interior approved a form of water-right application for use in signing up land under this unit. The application provides that the landowners shall sign a water-right application for such part of their holdings as they may desire to purchase water for, the quantity of water varying from one-half acre-foot to 2 acre-feet, the rate of delivery being in accordance with the desire of the applicant, but not to be greater than 40 per cent in any one month. The form of water-right application reads as follows:

#### FORM B.

Approved by the Secretary of the Interior  
March 17, 1915.

Spanish Fork Unit.  
Strawberry Valley Project.

Department of the Interior—Water-right application for lands in private ownership and lands other than homesteads under the reclamation act.

Act June 17, 1902 (32 Stat., 388). Act Aug. 9, 1912 (37 Stat., 265). Act Aug. 13, 1914 (38 Stat., 686).

Strawberry Valley Project. Serial No. .... State of Utah..... unit

1. I,.....

in pursuance of the provisions of the reclamation act approved June 17, 1902 (32 Stat., 388), and acts amendatory thereof, and supplementary thereto, especially the act approved August 9, 1912 (37 Stat., 265), and act August 13, 1914 (38 Stat., 686), all hereinafter called the reclamation law and the rules and regulations established thereunder, do hereby apply for a water right for the irrigation of and to be appurtenant to the irrigable land as shown on plats to be approved by the Secretary of the Interior within the tract described as follows:

..... section ..... township.....  
range ..... Salt Lake base and meridian, containing a total area  
of ..... acres.

2. The quantitative measure of the water right hereby applied for is that quantity of water which shall be beneficially used for the irrigation of said irrigable lands up to, but not exceeding, ..... per acre per annum, measured in Spanish Fork River, at the head of the ..... and in no case exceeding the share, proportionate to the irrigable acreage, of the water supply actually available as determined by the project manager or other proper officer of the United States, or of its successors in the control of the project, during the irrigation season for the irrigation of lands under said unit. The said water shall be delivered in Spanish Fork River, at the head of the ..... during the months of May to September, inclusive, at such rate of delivery as the water-right applicant may desire, in so far as such rate may be feasible, as determined by the United States; but in no event at a rate of flow per month greater than 40 per cent of the total annual supply in a flow as nearly uniform as practicable, unless otherwise

mutually agreed. The applicant assumes all risk of loss in the transporting of the water from the point of delivery to the said lands.

3. I, on behalf of myself, my heirs, executors, administrators, and assigns, hereby promise, covenant, and agree (a) to pay promptly when due each and every one of the annual installments of the construction charge fixed by the Secretary of the Interior in public notice to be issued in connection with the unit above described, being ..... per acre of irrigable land, payable in the manner provided for in section 1 of the reclamation extension act, and in addition thereto each and every annual charge for operation and maintenance, including any and all expense due to the exercise by the United States, or its successors in control of said unit, of the right reserved in paragraph 7 to secure proper delivery of water to individual water-right applicants under said unit, as fixed from time to time by the Secretary of the Interior, or the proper officer of the successors of the United States in the control of the project; (b) that each and all of the annual installments of the construction charge, and each and all of said annual charges for operation and maintenance, and each and every penalty attaching under the act of August 13, 1914 (38 Stat., 686), above mentioned, shall be and the same are hereby made a lien, upon the tract of land above described, and upon all water rights now or hereafter appurtenant or belonging thereto and all improvements now existing or hereafter made thereon, for myself, my heirs, executors, administrators, and assigns promising, covenanting, and agreeing to pay all taxes and other claims now or hereafter becoming a prior encumbrance, failing which, upon demand by any proper officer of the United States, or its successors in control of said project, the United States or its said successors may pay the same and add the amount thereof to the mortgage lien hereby created, and recover the amount so paid as part of the said lien.

4. Upon my failure to comply with the terms of the reclamation law, and the regulations thereunder, this application shall be subject to the penalties prescribed in the reclamation extension act of August 13, 1914 (38 Stat., 686).

5. This application must bear the certificate, as hereto attached, of the ..... , which has entered into contract with the United States, dated ..... , and duly recorded in the records of Utah County, Utah, and this application is expressly made subject to all the terms of said contract.

6. And I further promise, covenant, and agree for myself, my heirs, executors, administrators, and assigns that if any freehold interest in said tract shall, through the voluntary act of me or them, be acquired by any person not qualified by the reclamation law to purchase the water right hereby sought, this application and any such freehold interest shall be subject to forfeiture as provided by said law.

7. The applicant shall at his own expense arrange with the ..... for the carriage of the water furnished hereunder from the point of delivery by the United States to the land of the applicant, and shall bear his proportionate part of the cost to the United States of securing proper delivery of water to the water users under the ..... by the .....

The proportionate cost for the delivery of each acre-foot of water to the water-right applicant shall bear the same ratio to the total cost of operation and maintenance of the ..... system as the number of acre-feet of Strawberry Valley project water delivered bears to the total number of acre-feet of water delivered through the company's canal system. The proper officers and employees of the United States, and its successors, shall have at all times the right of access to the above-described premises whenever it is, in the judgment of the officers or employees in charge of said unit, necessary to secure equitable delivery of water to the lands of the applicant; and I for myself, my heirs, executors, administrators, and assigns, do hereby give, grant, bargain, sell, and convey to the United States and its said successors the right for any such proper officers or employees to go and come upon any and all lands under the ..... unit, now or hereafter owned or held by me or them, for said purpose, with the power to take necessary steps for the delivery of water under this or other water-right applications under this unit.

8. It is understood and agreed that the United States reserves the right upon my failure or the failure of my successors in interest to keep and perform any of the provisions in this instrument contained, by me and my successors in interest undertaken to be kept and performed, to refuse to deliver water to said lands or to stop the delivery of water thereto if water is being delivered, and such refusal to deliver or stoppage of delivery of water shall not operate to cancel this application, but shall be considered as an additional remedy to the United States to any remedies existing by reason of the provisions of this application or otherwise.

9. And I, for myself, heirs, executors, administrators, and assigns, do hereby grant, bargain, sell, convey, and confirm to the United States of America and its successors in charge of the project, all rights of way for telegraph, telephone, and power trans-

mission lines, and structures incidental thereto, constructed or that may hereafter be constructed, by or under the authority of the United States, to have and hold the same to the United States of America and its assigns and successors in charge of the project forever.

10. The United States assumes no obligation to the applicant other than the delivery of water in Spanish Fork River at the headworks of the ..... under the terms and provisions of the contract by and between the United States and the ..... referred to in article 5 hereof.

11. No Member of or Delegate to Congress, or Resident Commissioner, after his election or appointment or either before or after he has qualified and during his continuance in office, shall be admitted to any share or part of this contract or agreement, or to any benefit to arise thereupon. Nothing, however, herein contained shall be construed to extend to any incorporated company, where such contract or agreement is made for the general benefit of such corporation or company, as provided in section 116 of the act of Congress approved March 4, 1909 (35 Stat., 1109).

12. And I, the said ....., being duly sworn, depose and say that my post-office address is .....; that I am a bona fide resident upon said land (or occupant thereof, residing in the neighborhood, namely, upon section ....., township ....., range ....., ..... meridian, a distance in a direct line of ..... miles therefrom); that no other application, now uncanceled, has been made for a water right under the reclamation law, appurtenant to land now owned or claimed by me, except as follows:

Application No. .... project, of ..... for ..... section ....., township ....., range ..... meridian, and area of ..... acres, and containing ..... acres of irrigable land, as determined by the Secretary of the Interior; and that the present application is made in my own behalf and not at the instance or for the benefit of any other person or any association or corporation, either directly or indirectly.

13. Nothing in this application contained shall be construed as in any manner or at all abridging, limiting, or depriving the United States of any means of enforcing any remedy in law or equity for the breach of any of the provisions of this application which it would otherwise have.

In witness whereof I have hereunto set my hand and seal this ..... day of ....., 191 .....

..... [SEAL.]  
..... [SEAL.]

On June 30, 266 water-right applications had been executed on this unit, covering an area of approximately 5,600 acres, and on June 27 the delivery of stored water was commenced to the land that had signed water-right applications under the Spanish Fork East Bench Irrigation & Manufacturing Co. under this unit.

*Lake Shore unit.*—The Lake Shore unit covers an area of about 6,000 acres of low land located on the west side of the Spanish Fork River on the shore of Utah Lake. It is irrigated from the Lake Shore Canal, which has a fair flood-water right in the Spanish Fork River. After considerable negotiations a contract, dated October 12, 1914, was entered into with the Lake Shore Co. in which they agreed to deliver through their canal system any water that might be sold from the Strawberry Valley project to lands that are irrigated under the Lake Shore Canal, a reasonable charge to be made for such carriage; and on December 23, 1914, the Secretary approved a form of water-right application to be used in signing up land under this unit.

The price per acre-foot on this unit is \$45, the same as on the Spanish Fork unit, with the schedule of delivery and other conditions practically the same. On June 30, 68 water-right applications had been received on this unit, covering an area of approximately 1,500



acres, and the delivery of a flow of 8 second-feet of storage water was commenced on June 27, 1915. The water-right application used on this unit reads as follows:

Form B.

Approved by the Secretary of the Interior  
December 23, 1914.

Lake Shore unit  
Strawberry Valley project.

Department of the Interior—Water-right application for lands in private ownership and lands other than homesteads under the reclamation act.

Act June 17, 1902 (32 Stat., 388), act Aug. 9, 1912 (37 Stat., 265), act Aug. 13, 1914 (Public, No. 170).

Strawberry Valley project. Serial No. .... State of Utah. Lake Shore Unit.

.....  
(Date.)

1. I, ....., in pursuance of the provisions of the reclamation act approved June 17, 1902 (32 Stat., 388) and acts amendatory thereof, and supplementary thereto, especially the act approved August 9, 1912 (37 Stat., 265), and act August 13, 1914 (Public, No. 170), all hereinafter called the reclamation law and the rules and regulations established thereunder, do hereby apply for a water right for the irrigation of and to be appurtenant to the irrigable land as shown on plats to be approved by the Secretary of the Interior within the tract described as follows:

..... section .....  
township ....., range .....

..... meridian, containing a total area of ..... acres.

2. The quantitative measure of the water right hereby applied for is that quantity of water which shall be beneficially used for the irrigation of said irrigable lands up to, but not exceeding 1 acre-foot per acre per annum, measured in Spanish Fork River, at the head of the Lake Shore Canal, and in no case exceeding the share, proportionate to the irrigable acreage, of the water supply actually available as determined by the project manager or other proper officer of the United States, or of its successors in the control of the project, during the irrigation season for the irrigation of lands under said unit. The said water shall be delivered in Spanish Fork River, at the head of the Lake Shore Canal during the months of May to September, inclusive, at such rate of delivery as the water-right applicant may desire, in so far as such rate may be feasible, as determined by the United States, but in no event at a rate of flow per month greater than 40 per cent of the total annual supply in a flow as nearly uniform as practicable, unless otherwise mutually agreed. The applicant assumes all risk of loss in the transporting of the water from the point of delivery to the said lands.

3. I, on behalf of myself, my heirs, executors, administrators, and assigns, hereby promise, covenant, and agree (a) to pay promptly when due each and every one of the annual installments of the construction charge fixed by the Secretary of the Interior in public notice to be issued in connection with the unit above described, being \$45 per acre of irrigable land, payable in the manner provided for in section 1 of the reclamation extension act, and in addition thereto each and every annual charge for operation and maintenance, including any and all expense due to the exercise by the United States, or its successors in control of said unit, of the right reserved in paragraph 7 to secure proper delivery of water to individual water-right applicants under said unit, as fixed from time to time by the Secretary of the Interior, or the proper officer of the successors of the United States in the control of the project; (b) that each and all of the annual installments of the construction charge, and each and all of said annual charges for operation and maintenance, and each and every penalty attaching under the act of August 13, 1914 (Public, No. 170), above mentioned, shall be and the same are hereby made a lien upon the tract of land above described and upon all water rights now or hereafter appurtenant or belonging thereto and all improvements now existing or hereafter made thereon, for myself, my heirs, executors, administrators, and assigns, promising, covenanting, and agreeing to pay all taxes and other claims now or hereafter becoming a prior incumbrance, failing which, upon demand by any proper officer of the United States or its successors in control of said project, the United States or its said successors may pay the same and add the amount thereof to the lien hereby created, and recover the amount so paid as part of the said lien.

4. Upon my failure to comply with the terms of the reclamation law and the regulations thereunder, this application shall be subject to the penalties prescribed in the reclamation extension act of August 13, 1914 (Public, No. 170).

5. This application must bear the certificate, as hereto attached, of the Lake Shore Irrigation Co., which has entered into contract with the United States, dated October 12, 1914, and duly recorded in the records of Utah County, Utah, and this application is expressly made subject to all the terms of said contract.

6. And I further promise, covenant, and agree for myself, my heirs, executors, administrators, and assigns that if any freehold interest in said tract shall, through the voluntary act of me or them be acquired by any person not qualified by the reclamation law to purchase the water right hereby sought, this application and any such freehold interest shall be subject to forfeiture as provided by said law.

7. The applicant shall at his own expense arrange with the Lake Shore Irrigation Co. for the carriage of the water furnished hereunder from the point of delivery by the United States to the land of the applicant, and shall bear his proportionate part of the cost to the United States of securing proper delivery of water to the water users under the Lake Shore unit by the Lake Shore Irrigation Co. The proportionate cost for the delivery of each acre foot of water to the water-right applicant shall bear the same ratio to the total cost of operation and maintenance of the Lake Shore Irrigation Co.'s system as the number of acre-feet of Strawberry Valley project water delivered bears to the total number of acre-feet of water delivered through the company's canal system. The proper officers and employees of the United States, and its successors shall have at all times the right of access to the above-described premises whenever it is, in the judgment of the officers or employees in charge of said unit, necessary to secure equitable delivery of water to the lands of the applicant; and I for myself, my heirs, executors, administrators, and assigns, do hereby give, grant, bargain, sell, and convey to the United States and its said successors the right for any such proper officers or employees to go and come upon any and all lands under the Lake Shore unit, now or hereafter owned or held by me or them for said purpose, with the power to take necessary steps for the delivery of water under this or other water right applications under this unit.

8. It is understood and agreed that the United States reserves the right upon my failure or the failure of my successors in interest to keep and perform any of the provisions in this instrument contained, by me and my successors in interest undertaken to be kept and performed, to refuse to deliver water to said lands or to stop the delivery of water thereto if water is being delivered, and such refusal to deliver or stoppage of delivery of water shall not operate to cancel this application but shall be considered as an additional remedy to the United States to any remedies existing by reason of the provisions of this application or otherwise.

9. And I, for myself, heirs, executors, administrators, and assigns do hereby grant, bargain, sell, convey, and confirm to the United States of America and its successors in charge of the project, all rights of way for telegraph, telephone, and power transmission lines, and structures incidental thereto, constructed or that may hereafter be constructed by or under the authority of the United States, to have and hold the same to the United States of America and its assigns and successors in charge of the project forever.

10. The United States assumes no obligation to the applicant other than the delivery of water in Spanish Fork River at the headworks of the Lake Shore Canal under the terms and provisions of the contract by and between the United States and the Lake Shore Irrigation Co., dated October 12, 1914, referred to in article 5 hereof.

11. No Member of or Delegate to Congress or Resident Commissioner, after his election or appointment or either before or after he has qualified and during his continuance in office, shall be admitted to any share or part of this contract or agreement or to any benefit to arise thereupon. Nothing, however, herein contained shall be construed to extend to any incorporated company, where such contract or agreement is made for the general benefit of such corporation or company, as provided in section 116 of the act of Congress approved March 4, 1909 (35 Stat., 1109).

12. And I, the said ....., being duly sworn, depose and say that my post-office address is .....; that I am a bona fide resident upon said land (or occupant thereof, residing in the neighborhood, namely, upon section ....., township ....., range ....., meridian, a distance in a direct line of ..... miles therefrom); that I hold the following interest in the said tract: ..... as duly shown upon the records of ..... County, ..... in volume (liber) ....., at page (folio) .....; that no other application, now uncan- celled, has been made for a water right under the reclamation law, appurtenant to land now owned or claimed by me, except as follows:

Application No. .... project, of ..... for ..... section ....., township ....., range ....., meridian, an area of ..... acres,

and containing ..... acres of irrigable land, as determined by the Secretary of the Interior; and that the present application is made in my own behalf and not at the instance or for the benefit of any other person or any association or corporation, either directly or indirectly.

13. Nothing in this application contained shall be construed as in any manner or at all abridging, limiting, or depriving the United States of any means of enforcing any remedy in law or equity for the breach of any of the provisions of this application which it would otherwise have.

In witness whereof I, ....., have hereunto set my hand and seal this ..... day of ....., 191....

..... [SEAL.]  
..... [SEAL.]

In presence of:  
(Three witnesses must sign here.)

.....  
.....  
.....

*Mapleton unit.*—This unit covers an area of about 4,500 acres located on the east side of the project on the Mapleton Bench, a large part of the area having a partial water right from Hobbie Creek. The landowners submitted a petition stating that they desired to purchase water for between 3,000 and 4,000 acres of land, and after considerable negotiating a form of water-right application was approved similar to the one approved for the Lake Shore unit, but on presenting the water-right application to the landowners only a small part of the acreage represented by the petition executed a water-right application. On March 19 the committee submitted a petition asking that the construction of the Mapleton lateral be commenced, but, after considering all phases of the matter, the commission decided that it was not advisable to undertake the construction of this lateral until additional land had been signed up and the conditions imposed by the Secretary had been fulfilled. The lateral necessary to supply this land with water is rather costly, due to the several expensive structures necessary to bring it across the Spanish Fork Canyon and the double-track main line of the Denver & Rio Grande Railroad.

#### GRAZING LANDS.

The 60,160 acres of grazing land in the Strawberry Valley were leased to sheepmen during the year, the gross income being \$10,000. The final payment has been made for this grazing land as provided by law, and the land is not part of the Strawberry Valley project. Of this area approximately 7,300 acres are at present covered by the waters of the Strawberry Reservoir.

#### FINANCIAL STATEMENTS.

*Assets, liabilities, reserves, and capital, Strawberry Valley project to June 30, 1915.*

##### ASSETS.

Cash with special fiscal agent for deposit.....	\$6, 115. 44
Accounts receivable—Uncollected rentals of power and light.....	659. 90
Inventories:	
Animals.....	\$229. 40
Mechanical and other equipment.....	32, 214. 55
Material and supplies on hand in storehouses.....	13, 810. 79
Goods in transit.....	4, 828. 87
Unadjusted transfers between projects.....	4, 313. 73
	<hr/>
	55, 597. 34
Construction work contracted:	
Unearned value of construction work contracted.....	163, 893. 59

## Construction work in process:

Gross expenditures for construction of project to date.....	\$2, 808, 566. 00
Less revenues earned during construction, as follows:	
Rental of buildings.....	\$5, 675. 80
Rental of grazing lands.....	53, 068. 35
Rental of power and light.....	28, 149. 03
Rental of irrigation water.....	400. 00
Rental of telephones.....	1, 318. 82
Contractors' freight refunds.....	46. 06
Profits on merchandise store.....	9, 301. 51
Loss on hospital.....	2, 336. 28
Profits on mess house.....	5, 089. 79
Adjustments:	
Depreciation on plant and equipment.....	5, 760. 00
Total deductions.....	106, 463. 08
Net expenditures for construction of project to date.....	\$2, 702, 102. 92
Total assets.....	2, 928, 169. 19

## LIABILITIES, RESERVES, AND CAPITAL.

Accounts payable:	
Unpaid progress earnings under construction contracts.....	\$59, 196. 39
Unpaid contract holdbacks.....	15, 255. 32
Unpaid labor.....	13, 982. 51
Unpaid purchases.....	52, 875. 62
Unpaid freight and express.....	23, 835. 56
Unpaid passenger fares.....	214. 05
Unpaid agreements to purchase real estate.....	1, 689. 12
Unpaid miscellaneous.....	1, 645. 62
	168, 694. 19
Contingent obligations:	
Unearned value of construction work contracted.....	163, 893. 59
Reserves for repayment to reclamation fund of cost of project—Construction charges paid in advance by water-right applicants.....	6, 070. 19
Net investment:	
Disbursements.....	\$2, 684, 402. 69
Transfer received from other projects.....	102, 063. 41
	\$2, 786, 466. 10
Collections.....	151, 302. 61
Transfers issued to other projects...	45, 652. 27
	196, 954. 88
	2, 589, 511. 22
Total liabilities, reserves, and capital investment of the Government.....	2, 928, 169. 19

## Functional feature costs of Strawberry Valley project to June 30, 1915.

Examination and surveys.....	\$43, 969. 14
Storage system.....	1, 826, 415. 98
Canal system.....	630, 831. 12
Lateral system.....	133, 192. 06
Power system.....	71, 431. 19
Farm units.....	2, 854. 44
Permanent structures and land.....	5, 260. 00
Telephone system.....	14, 683. 61
Operation and maintenance during construction.....	78, 858. 81
Stores and other operations.....	1, 069. 65
Gross expenditure for construction of project to date.....	2, 808, 566. 00

<sup>1</sup> Deduct.

*Estimated cost of contemplated work, Strawberry Valley project, during fiscal year 1916.*

Examination and surveys.....	\$1,519.45
Storage system.....	1,024.95
Canal system.....	149,734.97
Lateral system.....	182,145.63
Power system.....	1,789.65
Farm units.....	878.10
Operation and maintenance during construction.....	34,409.25
Stores and other operations (reimbursable accounts).....	21,500.00
Total.....	<u>393,000.00</u>

## WASHINGTON, COOPERATIVE WORK.

*Palouse project.*—Upon the completion of the field work during June, 1914, the headquarters office was moved from Colfax, Wash., to Sunnyside, Wash., and the work of preparing plans and detailed estimates continued. These data when complete were embodied in a report and submitted to the supervising engineer at North Yakima, Wash. A board of engineers was convened and the report fully reviewed.

Under date of October 1, 1914, the board presented to the Secretary of the Interior and the governor of the State of Washington a report setting forth their conclusions regarding the feasibility of the project and the probable cost per acre under the two most favorable schemes of development. The Secretary of the Interior referred the report to Brig. Gen. William L. Marshall, consulting engineer to the Secretary, and to Mr. I. D. O'Donnell, supervisor of irrigation, for consideration and report.

### FINANCIAL STATEMENT.

*Assets, liabilities, reserves, and capital, Palouse cooperative investigations, to June 30, 1915.*

#### ASSETS.

Building work in progress—Investigations.....	<u>\$10,066.84</u>
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#### LIABILITIES, RESERVES, AND CAPITAL.

Accounts payable:			
Unpaid freight and express.....	\$3.97		
Unpaid passenger fares.....	15.00		
		18.97	
Capital investment:			
Net disbursement vouchers.....	\$9,374.75		
Transfer vouchers received.....	3,029.68		
		12,404.43	
Less—			
Collection vouchers.....	24.77		
Transfer vouchers issued.....	2,331.79		
		2,356.56	
		10,047.87	
Total liabilities, reserves, and capital.....		10,066.84	

*Functional feature costs of Palouse cooperative investigations to June 30, 1915.*

Examination and survey.....	<u>\$10,066.84</u>
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## **WASHINGTON, OKANOGAN PROJECT.**

CALVIN CASTEEL, project manager, Okanogan, Wash.

### **LOCATION.**

County: Okanogan.

Townships: 33 to 34 N., Rs. 25 to 27 E., Willamette meridian.

Railroad: Great Northern (branch line).

Railroad stations and estimated population, January 1, 1915: Okanogan, 700; Omak, 450; Riverside, 400.

### **WATER SUPPLY.**

Source of water supply: Salmon Creek.

Area of drainage basin: 121 square miles above Conconully Dam.

Annual run-off in acre-feet of Salmon Creek at Jones's ranch, near Okanogan (140 square miles), 1903 to 1914: Maximum, 56,500; minimum, 17,350; mean, 28,600.

### **AGRICULTURAL AND CLIMATIC CONDITIONS.**

Area for which the service is prepared to supply water, season of 1915: 10,099 acres.

Area under water-right applications, rental, and vested water-right contracts to June 30, 1915: 9,900 acres.

Length of irrigating season: May 1 to September 1—123 days.

Average elevation of irrigable area: 1,000 feet above sea level.

Average annual rainfall on irrigable area: At Omak, Wash., five years, 9.58 inches; 1914, 12.38 inches. At Conconully, Wash., at base of Salmon River watershed, 15 years, 16.53 inches; 1914, 18.69 inches.

Range of temperature on irrigable area:  $-10^{\circ}$  to  $105^{\circ}$  F.

Character of soil of irrigable area: Volcanic ash and gravel on upper benches and sand and gravel on lowlands along Okanogan River.

Principal products: Fruit, hay, grain, and vegetables.

Principal markets: States east.

### **LANDS OPENED FOR IRRIGATION.**

Dates of public notices and orders: November 12, 1908; March 12, 1910; April 8, 1910; February 23, 1911; March 28, 1911; April 29, 1912; July 6, 1912; March 10, 1913; June 16, 1913; January 16 and September 24, 1914; March 20 and May 15, 1915.

Location of lands opened: Tps. 33 and 34 N., Rs. 26 and 27 E., Willamette meridian.

Present status of irrigable area opened: Entered subject to the reclamation act, 1,234 acres; open to entry, none; private lands, 8,393 acres.

Limit of area of farm units: Public, 40 acres; private, 40 acres.

Duty of water:  $2\frac{1}{2}$  acre-feet per acre per annum at the farm.

Building charge per acre of irrigable land: \$65. Owing to proposed reconstruction of portions of project, new contract has been executed with Okanogan Water Users' Association providing for a maximum building charge of not more than \$110 per acre.

Annual rental charge: To be effective for irrigation year 1915, the annual rental charge is to be assessed according to amount of water used for all lands where stay of proceedings was taken advantage of, otherwise operation and maintenance charge has been changed from \$2.25 per acre to a rate based upon the amount of water used, \$1.50 being the minimum charge for one acre-foot of water, whether delivered or not, and \$1 for each additional acre-foot.

### **CHRONOLOGICAL SUMMARY.**

Reconnaissance and preliminary surveys begun in 1903.

Construction recommended by board of engineers, October 9, 1905.

Construction authorized by Secretary, December 2, 1905.

First irrigation by Reclamation Service, season of 1908.

Conconully Dam completed, August, 1910.

Project practically completed, October, 1910.

### IRRIGATION PLAN.

The irrigation plan of the Okanogan project provides for the storage of water in Salmon Lake and in Conconully Reservoir, controlled by Conconully Dam on Salmon Creek, about 2 miles below Conconully, Wash.; the control of Salmon Lake Reservoir by a short inlet canal from Salmon Creek and concrete outlet works; the control of Conconully Reservoir by means of an outlet tunnel discharging into Salmon Creek below the storage dam; the diversion of water from Salmon Creek by a dam about 12 miles below the reservoir into a canal system watering lands in the valley of Okanogan River between Riverside and Okanogan, Wash.; and the construction and operation of a pumping plant to be used to supplement the gravity supply of the project by pumping from the Okanogan River to approximately 1,050 acres of land on the sandy portion of the project known as Robinson Flat, where the duty of water is less than on the heavier soils. The power for the pumping is generated by two power plants constructed at drops Nos. 1 and 2 on the upper main lateral and transmitted to the pumping station near the town of Omak by  $5\frac{1}{2}$  miles of transmission line. This pumping plant is to be operated only during years when the gravity supply of water will not be sufficient.

The following features of the project—consisting of the inlet canal and outlet works to Salmon Lake; Conconully hydraulic filled dam, spillway, and outlet works; the diversion weir and distribution system—are completed and have been in use during irrigation seasons of 1910, 1911, 1912, 1913, and 1914.

### CONSTRUCTION DURING FISCAL YEAR.

*Canal lining.*—During the fall of 1914 and the spring of 1915 the work of placing concrete lining in portions of the canals and laterals of the distribution system, where seepage conditions were found to be bad, was continued and 17,885 linear feet of canals were lined with a plaster lining  $1\frac{1}{2}$  inches thick, placed upon a specifically prepared foundation, following the natural slope of canal banks. This work required 1,198.5 cubic yards of concrete.

*Extension of distribution system.*—This work was continued during the year, 3,630 linear feet of canal, with capacity less than 50 second-feet being constructed and 122 miscellaneous wooden structures, costing less than \$100 each, installed; 15,070 linear feet of black iron pipe were laid, ranging in size from 4 to 12 inches and in weight from 22 to 18 gauge, and 31 metallic structures were placed in concrete lined sections and in pipe lines. The pipe laid was manufactured under contract with local parties from iron supplied by the United States and dipped in two coats of asphaltum, in a dipping vat constructed and operated by the service at Omak for this purpose.

*Power plants and pumping plant.*—The final location of the transmission line and the staking out of the two power plants at Drops 1 and 2 began early in July. As soon as plans were received from the chief electrical engineer's office, excavation for foundations was begun. This work was continued until December 22, 1914. During this period the erection of the three reinforced concrete buildings was completed, together with the foundations for all of the machinery. The transmission line,  $5\frac{1}{2}$  miles long, was located and constructed ready for operation. All of the machinery was put in place and lined up, wiring in the two power plants was finished and 80 per cent of the wiring at the pumping plant was done.

The wood-stave pipe line was erected under contract with the American Wood Pipe Co. of Tacoma, and contract was let with W. A. Kraner & Co. for the erection of the steel pipe at the three plants.

The erection of these buildings required the following yardages for excavation, pounds of steel for reinforcing, and cubic yards of concrete in place.



Power plant No. 1: 46.4 cubic yards plain concrete in foundation, 25.8 cubic yards reinforced concrete, and 1,755 pounds of reinforcing steel.

Power plant No. 2: Reinforced concrete in foundation and walls, 101.5 cubic yards concrete and 3,500 pounds of reinforcing steel.

Pumping plant: Reinforced concrete in foundation and walls, 147 cubic yards of concrete, and 3,572 pounds of reinforcing steel.

Due to the extremely cold weather this work was discontinued on December 22, 1914, and resumed again in April, 1915. The excavation of trenches for the steel pipe was finished, the contractor for the erection of the steel pipe completed his work, and the wiring was done, together with such incidental work as was necessary.

Each of the plants, in so far as possible, has been run and tested out as to actual working conditions and to determine whether it will give results as specified in contracts.

The back cinching of the wood-stave pipe line was done in March, and the test, in accordance with the contract, was made. The proper anchors were made on this line; the outlet, involving 12 cubic yards of concrete, was constructed; and three road crossings over the pipe line were constructed, two of which are county road crossings and the other a private farm crossing. This necessitated the placing of 43 cubic yards of concrete and 2,910 pounds of reinforcing steel. These road crossings being necessarily high made obligatory the raising of the parallel State road for a distance of 500 feet, involving 60 cubic yards of earthwork and 132 cubic yards of shell-rock surfacing material.

#### OPERATION AND MAINTENANCE.

The irrigation season of 1914 began with the turning of water into the canals on May 7, and the system was operated for 119 days during the season, which closed on September 2. The service was prepared to deliver water during the year to 10,099 acres, of which 7,740 acres, or about 76.3 per cent of the total area of the project, were actually irrigated. Water was delivered to 448 farms, aggregating 8,960 acres of irrigable land. The season was most favorable for farming operations because of an abundance of water and a clear dry summer, which began before the irrigation season opened and lasted until after it closed. This created a maximum demand for water, but the results were better than would have been obtained with considerable intermittent rainfall.

The run-off of Salmon Creek for the year amounted to 35,750 acre-feet, which was about 30 per cent greater than the average annual run-off for the 12 years since records have been kept. This run-off was more than could be stored, and approximately 3,000 acre-feet were wasted into the Okanogan River, besides approximately 4,000 acre-feet remaining in storage at the end of the irrigation season.

During the season the entire distribution system, including 74 miles of canals and pipe lines, was operated and 20,035 acre-feet of water delivered to the farms, 29,700 acre-feet being diverted from Salmon Creek. The seepage and evaporation losses in the distribution system for the season amounted to 26.4 per cent of the amount of water diverted, or 11.6 per cent less than for 1913. This decrease was practically all due to concrete lining placed in the canals during the previous fiscal year. The amount of water delivered to the lands

was 2.59 acre-feet per acre of irrigated land. Of the irrigable area receiving water 6,455 acres were under the project canals. This land used 15,369 acre-feet, or 2.38 acre-feet per acre. The balance of the irrigable land before mentioned was irrigated from private or community canals diverting from Salmon Creek, the diversions being controlled by the United States. At the end of the calendar year 1914 the reservoirs of the project contained 7,519 acre-feet.

The total operation and maintenance cost for the irrigation year ending November 30, 1914, was \$10,438.32, which is equivalent to \$1.35 per acre irrigated, or \$1.03 per acre irrigable of the total area which will subsequently be subject to operation and maintenance charges. The operation and maintenance estimate for the year was \$2 per acre.

Water was delivered to the lands of the project on a rotation system of delivery which has been used for the two years previous and has given very satisfactory results. The period of rotation used was seven days of water with a double head and seven days dry period. In this way part of the system consisting of the small laterals can be left dry every other week, and a saving of water is thereby effected in seepage and evaporation losses.

Four washouts occurred during the irrigation season, only one of which did any particular damage. Each of them made it necessary to shut the water off, the shortest time being four hours and the longest being two days. Three of these washouts were caused by failure of wooden structures which had become old, and the fourth from choking up of drop with weeds on the first turning in of the water.

The season of 1915 started well with a large storage in the reservoirs. Due to a very light snowfall in the mountains during the winter, it appeared that a shortage of water might be possible. Considerable rain and snow fell, however, in May, which gave an abundance of water for the rest of the season and made necessary the running to waste of 7,500 acre-feet. Aside from an extra amount of rain during the month of May this project at the end of the fiscal year had enjoyed a normal season.

The first water for irrigation was released from the reservoir April 26, and preliminary deliveries were made on demand up until about the middle of June, when the regular deliveries on rotation schedules were begun. On May 10 both reservoirs of the project were full, and it was necessary to release more water than was used from the Conconully Reservoir in order to keep an extraordinarily large amount of water from going over the spillway and doing damage. This wasting of water continued, with the amount fluctuating from a few second-feet up to 250 second-feet until June 15, when the water level dropped below the spillway crest and all of the water being released was diverted into the canals for irrigation use. During the greater part of this flood period considerable rain fell on the project lands and the water users did not desire to use very much of the excess water in the creek.

Irrigation water was delivered to 450 farms during the season of 1915, the total irrigated area being 7,800 acres.

Crop prospects are good and prices for hay and fruit, the principal products of the project, make it appear that the farmers will begin to realize an income from their farms.

At the end of the fiscal year 14,850 acre-feet remained in storage, or only 750 acre-feet less than the total maximum storage capacity of the project.

*Historical review, Okanogan project.*

Item.	1910	1911	1912	1913	1914	1915 <sup>1</sup>
Acreage for which service was prepared to supply water.	9,500	10,061	10,061	10,084	10,099	10,099
Acreage irrigated.....	4,421	6,467	7,263	7,700	7,740	7,800
Miles of canal operated.....	41	41	46	47	74	77
Water diverted (acre-feet).....	17,290	17,490	18,740	20,300	29,700	30,000
Water delivered to land (acre-feet).....	9,300	8,259	9,040	11,993	20,035	20,000
Per acre of land irrigated (acre-feet).....	2.46	1.27	1.24	1.57	2.59	2.50

<sup>1</sup> Estimated.

### SETTLEMENT.

Economic conditions on the project are improving, as bank statements show a further increase in deposits over the previous year, and considerable building has been done in the project towns. The movement of land has increased somewhat over that of the previous year, but there is still very little of it changing hands. Prices have dropped considerably within the last year, the price for improved property being approximately \$400 per acre and for unimproved property from \$100 to \$150 per acre, with prices considerably lower than this on the sandy or poorer portions of the project. Very little improvement in raw land has been made during the past year. It is, however, believed that, with the water supply assured, the fixing of the ultimate cost of the project, and the enforced cultivation due to the reclamation extension act, all the lands of the project will show early improvement.

Practically all of the fruit growers have organized during the past winter, joining the Northwest League, a nonprofit-sharing organization for the purpose of selling fruit. This organization does not itself sell the fruit, but has the right to approve or disapprove any member's choice of a selling organization, and, after a certain date, may choose the selling organization.

Approximately 15 miles of road have been improved by grading and surfacing. This has been done for the most part by the formation of road improvement district organizations; a small part of it is done by county work. These roads are fairly permanent and with proper maintenance will give excellent satisfaction for a number of years.

Daily mixed train service was continued throughout the fiscal year until June 14, 1915, when a passenger-train service, making the round trip from Oroville to Wenatchee each day, was inaugurated. This was made necessary by the heavy tonnage of products to be shipped out of the Okanogan Valley within the next few months, which would make very uncertain the schedule of the passenger and freight service combined.

Three rural-delivery routes, one of which delivers mail to the project headquarters, have been established on the project, and practically the entire project is covered by this service. The last two, begun on June 16, are only triweekly service, but, due to the amount of mail handled, will undoubtedly be increased to a daily service at an early date.

*Settlement data, Okanogan project.*

Item.	1913	1914	1915
Total number of farms on project.....	525	550	560
Population of.....	1,200	921	975
Number of irrigated farms.....	441	448	455
Operated by owners or managers.....	439	448	450
Operated by tenants.....	2	2	5
Population of.....	1,200	921	975
Number of towns.....	3	3	3
Population of.....	1,200	1,350	1,600
Total population in towns and on farms (sum of 2 and 8).....	2,400	2,271	2,575
Number of public schools.....	7	7	7
Number of churches.....	6	7	8
Number of banks.....	4	4	4
Total capital stock.....	\$135,000	\$135,000	\$135,000
Total amount of deposits.....	\$250,000	\$272,000	\$325,000
Total number of depositors.....	1,485	1,589	1,650

**PRINCIPAL CROPS.**

During 1914, 448 farms, and an area of 3,180 acres under the project, were cropped, the total value of the crops being \$104,575, an increase of practically 25 per cent over the previous year. The principal crops raised were various kinds of hay grown in irrigated sections, berries and truck, corn, fruit, and potatoes.

The area cropped shows an increase of 444 acres, due to young orchards coming into bearing, the increase in value of these crops amounting to \$18,088.

During the fiscal year 63 carloads of fruit were shipped from the project, consisting principally of apples, three carloads being peaches and apricots. Practically all shipments were made through the Wenatchee Fruit Growers' Association. Due to very poor market, returns to the grower were small.

*Crop report of irrigated lands on Okanogan project, Washington, year of 1914.*

Irrigated crop.	Area acres.	Unit of yield.	Yields.		Values.	
			Total.	Average per acre.	Per unit of yield.	Total.
Alfalfa hay.....	1,095	Tons.....	3,754	3.4	\$8.50	\$31,909
Apples.....	1,476	Pounds.....	1,908,415	1,285	.02	37,969
Beans.....	20	Bushels.....	260	13	3.50	910
Clover hay.....	10	Tons.....	24	2.4	10.00	240
Corn, Indian.....	70	Bushels.....	1,750	25	.60	1,050
Corn, fodder.....	55	Tons.....	85	1.5	7.00	595
Fruits, small.....	26	Pounds.....	62,100	2,350	.04	2,484
Garden.....	59	do.....				4,530
Hay (except alfalfa and clover).....	200	Tons.....	150	.75	10.00	1,500
Onions.....	3	Bushels.....	210	70	1.35	283
Pasture.....	113					1,695
Peaches.....	175	Pounds.....	540,390	3,085	.01	5,404
Pears.....	35	do.....	61,115	1,745	.02	1,222
Prunes.....	4	do.....	13,400	3,350	.01	134
Potatoes, common.....	95	Bushels.....	10,500	110	.60	6,300
Nursery stock.....	17	do.....				3,525
Apricots.....	75	Pounds.....	190,000	2,535	.0125	2,375
Carrots.....	20	Tons.....	120	6	10.00	1,200
Miscellaneous.....	25					650
Less duplicated areas.....	393					
Total acreage cropped under irrigation.....	3,180		Total and average.....			104,575
Irrigated, not cropped:						32.88
Nonbearing orchards.....	4,260					
Young alfalfa (no crop).....	228					
Ground fall plowed.....	178					
Miscellaneous.....	882					
Less duplicated areas.....	1,088					
Grand total irrigated.....	7,740					

*Crop report of irrigated lands on Okanogan project, Washington, year of 1914—Con.*

Areas.	Acres.	Farms.	Per cent of project.
Total irrigable area farms reported.....	8,960	448	88.3
Total irrigated area farms reported.....	7,740	448	76.2
Under water-right applications.....	7,529	428	74.1
Under rental contracts.....	211	20	2.1
Total cropped area farms reported.....	3,180	448	31.3

**PUBLIC NOTICE DATED MAY 15, 1915.**

1. This notice shall relate exclusively to water-right applicants and entrymen who did not avail themselves of the stay of proceedings offered by the order of April 29, 1912.

2. Under the terms of existing public notices and orders, the operation and maintenance charges become due on May 1 of each year, in advance.

3. In pursuance of the provisions of the reclamation act of June 17, 1902 (32 Stat., 388), and acts amendatory thereof and supplemental thereto, and in particular the reclamation extension act of August 13, 1914 (38 Stat., 686), section 6 of which authorizes the Secretary of the Interior to fix the due date for operation and maintenance charges, notice is hereby given that the operation and maintenance charge for the persons aforesaid, which under existing public notices became due May 1, 1915, is postponed to and shall become due on March 1, 1916, and all operation and maintenance charges hereafter made against lands under the said project shall become due on March 1 of each year thereafter until further notice.

4. The discount for payment made on or before the due date and the penalties for failure to make payment before the first day of the third calendar month after the due date will be applied as provided in section 6 of the said reclamation extension act.

5. Each acre of irrigable land, whether irrigated or not, shall be charged with a minimum operation and maintenance charge of \$1.50, which will permit delivery of not more than 1 acre-foot per acre. Should further quantities be needed, they will be furnished at the rate of \$1 per acre-foot.

6. Except as hereinbefore provided, all the terms and provisions of existing public notices and orders for the Okanogan project shall remain unchanged.

BO SWEENEY,  
*Assistant Secretary.*

**ORDER DATED JULY 28, 1915.**

Whereas all landholders under the Okanogan project, Washington, who duly accepted the stay of proceedings and the conditions thereof as set forth in the order issued April 29, 1912, have been subject to the payment of a water-rental charge of \$3 per acre of irrigable land per annum; and

Whereas section 11 of the reclamation-extension act of August 13, 1914 (38 Stat., 686), provides for water service in advance of the fixing of the construction charge, and that the charges for such service shall be subject to the same penalties and to the provisions for cancellation and collection as therein provided for other operation and maintenance charges:

Now, therefore, it is hereby ordered that the water service or rental charge against lands entitled to the stay of proceedings provided for in the order of April 29, 1912, for the Okanogan project beginning with the irrigation season of 1915 and continuing thereafter until further notice, shall be as follows, viz:

1. The lands of the project shall, for the purpose of fixing the rental charges, be divided into three classes, viz:

Class A, lands with a light volcanic ash soil requiring the minimum amount of water for irrigation.

Class B, lands requiring a larger amount of water than class A but not so much as class C.

Class C, lands having the coarsest and most porous soils and requiring the maximum amount of water.

2. A minimum charge of \$1.75 per irrigable acre per annum is hereby fixed for each irrigable acre in classes A, B, and C, which will entitle the water user of class A lands to 1 acre-foot per acre per annum; class B lands to  $1\frac{1}{2}$  acre-feet per acre per annum; and class C lands to 2 acre-feet per acre per annum. Additional quantities of water for lands in classes A, B, and C will be furnished at the rate of 50 cents per acre-foot.

3. The classification of the lands is shown on a map duly filed in the records in the project office.

4. All of said lands shall be subject to the provisions for discounts and penalties, cancellation and collection, as provided in the reclamation-extension act for other operation and maintenance charges.

A. A. JONES,

*First Assistant Secretary of the Interior.*

#### FINANCIAL STATEMENTS.

*Assets, liabilities, reserves, and capital, Okanogan project, to June 30, 1915.*

##### ASSETS.

##### Accounts receivable:

Construction charges due and uncollected from water-right applicants.....	\$52,470.07	
Construction charges unaccrued on contracts with water-right applicants.....	827,385.60	
Uncollected water rentals.....	9,960.00	
		<b>\$889,815.67</b>

##### Inventories:

Animals.....	425.00	
Mechanical and other equipment.....	1,633.00	
Material and supplies in storehouse.....	5,461.40	
		<b>7,519.40</b>

##### Construction work in process:

Gross expenditures for construction of project to date. 783,701.52

Less revenues earned during construction,

as follows:

Rentals of buildings.....	\$224.00
Rentals of grazing lands.....	540.00
Rentals of irrigation water.....	1,670.50
Loss on mess houses.....	193.83
Profit on hospital.....	213.13

Total deductions..... 2,453.80

Net expenditures for construction of project to date..... 781,247.72

Total assets..... 1,678,582.79

<sup>1</sup> Deduct.

## LIABILITIES, RESERVES, AND CAPITAL.

Accounts payable:		
Unpaid labor.....	\$2, 597. 65	
Unpaid purchases.....	10, 720. 12	
Unpaid freight and express.....	3, 990. 11	
Unpaid passenger fares.....	80. 30	
		\$17, 388. 18
Reserves for repayment to reclamation fund of cost of project:		
Value of construction contracts with water-right applicants.....	896, 320. 00	
Construction charges paid in advance by water-right applicants.....	8, 085. 00	
		904, 405. 00
Net investment:		
Disbursements.....	\$830, 157. 55	
Transfers received from other projects....	33, 721. 47	
		863, 879. 02
Less—		
Collections.....	137, 502. 50	
Transfers issued to other projects....	10, 304. 51	
		147, 807. 01
Total.....		716, 072. 01
Revenues in excess of cost of operation and maintenance.....		40, 717. 60
Total liabilities, reserves, and capital investment of the Government.....		1, 678, 582. 79

*Functional feature costs of Okanogan project to June 30, 1915.*

Examinations and surveys.....	\$4, 603. 27
Storage system.....	339, 380. 14
Distribution system.....	418, 651. 80
Farm units.....	1, 889. 92
Permanent structures and land.....	8, 371. 28
Telephone system.....	6, 068. 75
Operation and maintenance during construction.....	4, 736. 36
Gross construction cost to date.....	783, 701. 52

*Operating revenues and expenses, Okanogan project, to June 30, 1915.*

## EXPENSES.

Storage system:		
Operation.....	\$4, 795. 75	
Maintenance.....	711. 85	
		\$5, 507. 60
Canal and lateral system:		
Operation.....	14, 428. 05	
Maintenance.....	28, 281. 70	
		42, 709. 75
Undistributed expenses:		
Operation.....	8, 774. 10	
Maintenance.....	16, 376. 48	
		25, 150. 58
Cost ledger inventories.....		394. 41
Revenues in excess of cost of operation and maintenance carried to credit side of assets and liabilities statement.....		40, 717. 60
Total.....		114, 479. 94

## REVENUES.

Operation and maintenance charges accrued.....	\$35,440.12
Rentals of lands and buildings.....	1,399.25
Rentals of irrigation water.....	77,398.70
Penalties collected on water-rental charges.....	241.87
Total.....	<u>114,479.94</u>

*Estimated cost of contemplated work, Okanogan project, during fiscal year 1916.*

Lateral system.....	\$28,800.00
Power system.....	2,600.00
Operation and maintenance under public notice.....	19,000.00
Stores and other operations (reimbursable accounts).....	600.00
Total.....	<u>51,000.00</u>

8004°—15—19



## WASHINGTON YAKIMA PROJECT.

R. K. TIFFANY, project manager, Sunnyside and Tieton units, North Yakima, Wash.;  
C. E. CROWNOVER, project manager, storage unit.

### LOCATION.

Counties: Yakima, Benton, and Kittitas.

Townships: 8 to 22 N., Rs. 11 to 26 E., Willamette meridian.

Railroads: Northern Pacific; Chicago, Milwaukee & St. Paul; Oregon-Washington Railroad & Navigation Co.; Yakima Valley Transportation Co.

Railroad stations and estimated population January 1, 1915: Grandview, 700; Sunnyside, 1,430; Outlook, 150; Granger, 360; Zillah, 500; Mabton, 600; Byron, 50; Prosser, 1,500; Ellensburg, 5,000; Thorp, 300; Yakima, 200; North Yakima, 16,500; Naches, 500; Wapato, 500; Toppenish, 1,700; and Parker, 50.

### WATER SUPPLY.

#### SUNNYSIDE UNIT.

Source of water supply: Yakima River and tributaries.

Area of drainage basin: 5,270 square miles.

Annual run-off in acre-feet of Yakima River at Union Gap: 3,550 square miles, 1897 to 1914, maximum, 4,370,000; minimum, 2,390,000; mean, 3,331,000.

#### TIETON UNIT.

Source of water supply: Tieton River and its tributaries.

Area of drainage basin: 247 square miles.

Annual run-off in acre-feet of Tieton River at canal headworks, 1908-1914, maximum, 484,000; minimum, 307,000; mean, 395,000.

### AGRICULTURAL AND CLIMATIC CONDITIONS.

Area for which service is prepared to supply water, season of 1915: Sunnyside unit, 81,807 acres; Tieton unit, 33,600 acres.

Area under water-right applications and rental contracts, season of 1915: Sunnyside unit, 75,522 acres; Tieton unit, 27,417.22 acres.

Length of irrigating season: Sunnyside unit, April 1 to October 24, 207 days; Tieton unit, May 1 to October 1, 153 days.

Average elevation of irrigable area: 1,000 feet above sea level.

Average annual rainfall on irrigable area: At Sunnyside, 1895 to 1914, 6.59 inches; 1914, 8.27 inches; at Tieton, 1914, 9.16 inches.

Range of temperature on irrigable area:  $-21^{\circ}$  to  $110^{\circ}$  F.

Character of soil of irrigable area: Sunnyside unit—on about three-fourths of the unit the soil is sandy loam or volcanic ash from 10 to 60 feet deep. The remainder is decomposed basalt, underlain by gravel or a combination of this with the above-named soils. Tieton unit—volcanic ash.

Principal products: Forage, hops, vegetables, and fruit; stock and dairy products.

Principal markets: Seattle, Tacoma, and Spokane, Wash., Alaska, and eastern cities.

### LANDS OPENED FOR IRRIGATION.

#### SUNNYSIDE UNIT.

Dates of public notices: November 18, 1908; March 2, 1909; April 18, April 19, May 2, 1910; March 15, 1911; February 29, May 31, 1912; June 16, June 23, October 2, 1913; March 10, April 11, and September 24, 1914; March 31, 1915.

Location of lands opened: Tps. 8 to 12 N., Rs. 19 to 25 E., Willamette meridian.

Present status of irrigable lands opened: 1,500 acres entered subject to reclamation act; 600 acres of State lands; 79,707 acres in private ownership.

Duty of water: 3 acre-feet per acre per annum at the farm.  
 Limit of area of farm units: Public, 80 acres; private, 160 acres.  
 Building charge per acre of irrigable land: \$52.  
 Annual operation and maintenance charge: \$1 per acre vested water rights; 80 cents for 2 acre-feet, \$1.05 for 3 acre-feet, \$1.65 for 4 acre-feet, and 80 cents additional for each acre-foot thereafter for public notice lands.

#### TIETON UNIT.

Dates of public notices and orders: November 7, 1910; March 8, April 14, 1911; January 24, February 21, April 18, May 10, 1912; March 21, April 25, June 16, 1913; March 4, September 24, 1914; March 9, March 20, 1915.

Location of lands opened: Tps. 12 to 15 N., Rs. 16 to 18 E., Willamette meridian.  
 Present status of irrigable land: 1,953 acres entered subject to the reclamation act; 201.13 acres open to entry; 2,274 acres State land; 329 acres railroad land; 24,706.39 acres in private ownership covered by water-right application; 4,139.95 acres in private ownership, unapplied for; State lands that have made water-right application, 626 acres.

Duty of water: 2.17 acre-feet per acre per annum at the farm.  
 Limit of area of farm units: Public, 40 acres; private, 160 acres.  
 Building charge per acre of irrigable land: \$93.  
 Annual operation and maintenance charge: Minimum, \$1.25 per acre of irrigable land for 1 acre-foot or less; additional supply to be charged for as follows: 25 cents for first acre-foot and at the rate of 75 cents per acre-foot thereafter.

#### CHRONOLOGICAL SUMMARY.

Reconnaissance and preliminary surveys in 1903.  
 Report of board of engineers recommending construction October 16, 1905.  
 Construction of Sunnyside and Tieton units authorized by Secretary December 12, 1905; Wapato unit, June 16, 1906.  
 Sunnyside Canal purchased June 23, 1906.  
 First irrigation by Reclamation Service, Sunnyside unit, season of 1907.  
 Tieton diversion dam completed December, 1908.  
 Tieton Main Canal completed in 1909.  
 Bumping Lake Dam completed in 1910.  
 First irrigation by Reclamation Service, Tieton unit, season 1911.  
 Distribution system, Sunnyside unit, completed in 1911.  
 Tieton unit completed winter 1911-12.  
 Kachess Dam completed fall of 1912.  
 Warren Act contract with Kittitas reclamation district executed by Secretary of Interior January 18, 1913.  
 Contract with Sunnyside irrigation district signed October 6, 1914.  
 Contract with Snipes Mountain irrigation district signed November 16, 1914.  
 Contract with Outlook irrigation district signed November 23, 1914.  
 Clear Creek Dam completed November, 1915.  
 Per cent completed June 30, 1915: Storage unit, 31.6 per cent; Sunnyside unit, 81 per cent; Tieton unit, 98 per cent.

#### IRRIGATION PLAN.

The irrigation plan of the Yakima project provides for the storage of flood waters of the Yakima River and its tributaries in Kachess, Keechelus, Clealum, and Bumping Lakes, and in a reservoir at McAllister Meadows; the diversion of water from the Yakima River for the irrigation of 62,000 acres of land on both sides of the river in the vicinity of Ellensburg, comprising the Kittitas unit; the diversion of water from the east bank of the Yakima River near Parker for the irrigation of 100,000 acres of land by means of the old Sunnyside Canal, as improved and extended by the Reclamation Service, comprising the Sunnyside unit; the diversion of water from the Tieton River below McAllister Meadows (a reservoir being provided on the headwaters of this stream to regulate diurnal flow) for the irrigation of 34,000 acres of land lying between the Naches River and Ahtanum Creek, in the vicinity of North Yakima, comprising the Tieton unit; and the diversion of water from the west bank of the Yakima River near Parker for the irrigation by means of the canal system of the Yakima Indian Reservation, improved and extended, of 106,000 acres of land by gravity and 14,000 acres of land by pumping with power developed at drops in the canals, comprising the Wapato unit. The plan also provides for the development of

power from drops in the main canals and laterals of the Sunnyside and Tieton units to be used for pumping irrigation water and for other purposes. The United States claims all waste, seepage, spring, and percolating water arising within the project and proposes to use such water in connection therewith.

The following features of the above plan have been completed: Sunnyside unit: Diversion dam, enlargement of main canal, Sulphur Creek wasteway, and the distribution system, with the exception of small laterals, etc., to lands not yet applied for; Benton extension (Sunnyside irrigation district), 98 per cent completed; Snipes Mountain pumping plant and distribution system, 86 per cent completed. Tieton unit: Bumping Lake storage dam, Clear Creek Dam, extension of Tieton Canyon road to site of Clear Creek regulating reservoir on the headwaters of the Tieton River, Tieton River diversion dam, main canal, and distribution system. Storage unit: Kachess Dam; construction work is in progress on Keechelus Dam, the clearing of reservoir sites at Bumping Lake, Lakes Kachess, Keechelus, and Clealum. The features for future construction are: Outlook, Grandview, and Mabton pumping plants and Granger siphon, with necessary distribution system; Clealum and McAllister Meadows Reservoirs.

### STORAGE UNIT.

#### CONSTRUCTION DURING FISCAL YEAR.

*General.*—At the headwaters of the Yakima River and its tributaries are the reservoir sites, which, when developed, will have a total capacity of 1,084,600 acre-feet. Prior to this year the Bumping Lake, Kachess Lake, and Clear Creek Reservoirs were completed, giving a combined storage capacity of 247,360 acre-feet. Lake Keechelus, with a capacity of 152,000 acre-feet, is now under construction, while those yet to be constructed are Lake Clealum and Tieton (McAllister), with a combined capacity of 680,000 acre-feet.

#### KEECHELUS DAM.

During the year the cut-off trench was completed and the core wall finished except in the river section. All of the cut-off trench in which the core wall had been placed was back filled. Work on the embankment continued on both sides of the river, a total of 137,000 cubic yards of fine material and 73,000 cubic yards of gravel being placed. Both kinds of material were loaded from borrow pits with steam shovels and drag-line excavators, hauled in  $1\frac{1}{2}$  cubic yard cars by 10-ton dinkeys over 2-foot-gauge tracks. The tight portion of the water-side was spread with fresnos in thin layers, sprinkled and rolled, while the gravel was spread but not rolled. Eighteen thousand cubic yards of riprap 2 feet in thickness were laid on the upper face. Under the riprap were placed 29,000 cubic yards of smaller foundation rock 3 feet in thickness. Most of both riprap and foundation rock was picked out of the material that came from the borrow pits. Some riprap rock was quarried at the spillway cut.

*Outlet works.*—The excavation for the outlet channel was practically completed. The dipper dredge working from the lake end handled 187,000 cubic yards, while the drag-line excavator operating from the lower end moved 43,000 cubic yards. The lake was lowered as much as possible in March, the cofferdams and diversion flume built, and the river section unwatered in May. At the end of the year forms were being placed for the outlet conduit, the deep trench for the river section of core wall was being excavated, and excavation for gate tower was started.

*Spillway.*—The spillway is located in solid rock, and only such excavation was done as was necessary to secure riprap for the dam and crusher rock for concrete; 16,000 cubic yards were excavated.

*General.*—A pit for securing gravel for the dam was opened up on the north side of the river; about 10 miles of telephone line were constructed connecting Keechelus Dam with Easton to replace that formerly leased from the Postal-Telegraph-Cable Co.; a few small construction plants were erected and maintenance work was done on those already built, as well as on construction roads and bridges. The Keechelus Dam is 60.5 per cent completed. The principal items of work accomplished were: Clearing, 11 acres; grubbing, 9 acres; excavation, 465,000 cubic yards; embankment, 212,000 cubic yards; revetment, 47,000 cubic yards; concrete, 700 cubic yards; and sheet piling, 730 lineal feet of penetration.

#### TIETON (M'ALLISTER MEADOWS).

During July, August, and September an engineering party conducted investigations at this reservoir for the purpose of securing sufficient data for the preparation of final plans and estimates for fixing the storage cost. The former test pits at the dam site were deepened and the borrow pits for hydraulic material thoroughly investigated. Topographical surveys were extended of the reservoir site from the 2,890 to the 2,950 contour, and detailed surveys made of the hydraulic canal, power canal, spillway, and camp sites.

#### LAKE CLEALUM.

For the same purpose as stated for Tieton Reservoir engineering investigations were conducted at Lake Clealum. The permanent development contemplates, in addition to raising the lake by the construction of an earth dam across the Clealum River, the lowering of the lake through a tunnel approximately 2 miles long into the Yakima River. Test pits were dug and wash drill borings were made in the river section, and the borrow pits for embankment thoroughly explored. A diamond drill hole was bored at the lake end of the proposed tunnel. A subsurface survey was made of the portion of the lake that it is proposed to lower below its natural surface. Topographical surveys were made along the Yakima River in the vicinity of the proposed outlet tunnel.

No repairs to the temporary crib dam were necessary during the year.

#### CLEARING RESERVOIR SITES.

The portion of the reservoir areas at Bumping Lake, Clealum Lake, Kachess Lake, and Keechelus Lake that will be submerged by reason of the construction of permanent dams is covered with a heavy growth of timber, which is to be removed before the water is raised.

*Lake Kachess.*—During the year approximately 4,700,000 feet, board measure, of merchantable timber were cut and stored in the lake. About 3,000 cords of wood were cut and delivered on board cars at Easton. In connection with these operations about 250 acres were cleared. The work was done entirely by Government forces.

*Lake Clealum.*—The logging is being done under contract by the Roslyn Lumber Co. Approximately 1,150,000 feet, board measure, were cut and sawed.

*Lake Keechelus.*—No work was done during the year by the contractors, the Flanagan Lumber Co. Negotiations have been underway looking toward the cancellation of the contract so that work may be started on the removal of this timber and the clearing of the reservoir site.

### SUNNYSIDE UNIT.

#### CONSTRUCTION DURING FISCAL YEAR.

*General.*—The construction work on the Sunnyside unit during the fiscal year 1915 consisted of the extension of the distribution system to reach lands just completing water-right application; the construction of turnouts and deliveries from the Main Canal to serve the Piety Flat water users; sluicing at the sites of the power plants for the Snipes Mountain and Outlook irrigation districts; the placing of gravel riprap along the Main Canal, from mile 0 to mile 50; and the enlargement of the Main Canal from mile 50 to mile 59.40, including the construction of two Main Canal drops and an overflow weir and diversion works for the Sunnyside irrigation district, as well as the replacement of the wood flume at mile 55 with a steel flume, and the construction of the power plants, canals, and distribution systems for the Sunnyside, Snipes Mountain, and Outlook irrigation districts.

*Extension of distribution system.*—The extension of the distribution system consisted of the construction of small laterals, flumes, pipe lines, and wood structures necessary to carry water from existing canals or laterals to the new lands being placed under cultivation. Deliveries were made to some 30 new tracts of land.

*Turnouts and measuring boxes.*—The construction of the turnouts and deliveries to the Piety Flat lands consisted of the installation of four steel gate type turnouts in the Main Canal, between mile 2 and mile 4, and six concrete measuring boxes on the adjacent Main Canal right of way.

*Sluicing.*—The sluicing at the power site for the Snipes Mountain and Outlook irrigation districts consisted of the removal of earth from the power lateral and power plant sites by using the irrigation water for sluicing, the sluiced material being deposited in the canal and lateral system on the Snipes Mountain division. Approximately 55,000 cubic yards of earth were excavated in this manner.

*Main Canal.*—To provide for the increased quantity of water needed for the lands under the Sunnyside irrigation district, the Snipes Mountain irrigation district, and the Outlook irrigation district, it was decided to provide for a raised water surface and an increased velocity in the Main Canal from the intake to mile 50.5 by sloping banks and placing loose gravel riprap on the banks at those points where erosion is apt to occur. This work consisted of the placing of some 9,000 cubic yards of loose gravel on a total length of approximately 11 miles of Main Canal banks.

The work on the Main Canal, from mile 50.5 to mile 59.3, consisted of an actual enlargement of the canal section to provide for an increase in capacity of 100 second-feet throughout the entire reach;

the construction of concrete drops at mile 52.6 and mile 57.6; the reconstruction and enlargement of the flume at mile 55; and the construction of an overflow and headworks for the Sunnyside irrigation district at mile 59.4.

The enlargement of the canal section resulted in a capacity in the Main Canal of approximately 270 cubic feet per second at mile 50.5 and a capacity of 170 cubic feet per second at mile 59.4. It consisted in general of the widening of the original canal section by the removal of material from the upper side, leaving the bottom and lower side practically untouched except where slight changes were made in the alignment of the old canal. The excavated material consisted of earth, cement gravel, and solid rock. The estimated quantities of excavation in this reach are 42,000 cubic yards of classes 1 and 2, and 28,000 cubic yards of class 3.

The drop at mile 52.6 is a 3-panel flashboard reinforced concrete structure; that at mile 57.6 a 2-panel flashboard reinforced concrete structure. At mile 55 the flume was a wooden structure. This was torn out and replaced with a No. 192 Hinman steel flume of approximately 190 cubic feet per second capacity carried on a wooden substructure mounted on concrete pedestals. The work at mile 59.4 consisted of the lengthening of a 50-foot overflow concrete weir to 75 feet, raising it 6 inches, and the installation of two 4 by 4 feet cast-iron gates to serve as a headwork for the Sunnyside irrigation district.

*Snipes Mountain irrigation district.*—This district was organized under State law for the irrigation of 2,000 acres lying above gravity canals in the center of the Sunnyside unit. Construction work, comprising the South Branch pumping plant, where 500 horsepower are developed, and the Hillcrest plant, where 30 horsepower are developed, as well as the necessary distribution system, was done by the United States under contract with the district dated November 16, 1914.

The pumping plants are direct-connected turbines and centrifugal pumps. Delivery pipes and penstocks are of wood-stave construction, and the distribution system consists of small plaster-lined open ditches and vitrified clay pipe lines almost exclusively. At the end of the year the work was practically completed except for a working test of the pumping machinery.

*Outlook irrigation district.*—Contract with this district was executed by the comptroller on January 11, 1915, and construction was started about February 1. Power is developed from a drop of 45 feet from the Main Canal into Snipes Mountain Canal, approximately 800 horsepower being available.

The pumping plant is in two units, one a 24-inch single stage, centrifugal pump direct connected to a 560 horsepower turbine, and the other a 16-inch single stage centrifugal pump direct-connected to 240 horsepower turbine. The penstocks are of concrete 72 inches and 48 inches in diameter, respectively, and the wood-stave delivery pipe is 46 inches in diameter and 4,800 feet long.

The power house, penstocks, delivery pipe, and excavation for the distribution system were completed during the fiscal year.

#### DRAINAGE.

The Sulphur Creek wasteway is the only drainage feature constructed on the Sunnyside project by the Reclamation Service, and it was built to serve a twofold purpose—first, as an outlet to relieve

the main canal in times of emergency and for surplus water in the main canal, and, second, to provide a main drain for wet lands in the basin between Outlook and Grandview.

Previous to 1913 the drainage laws of the State were such that little was done by the owners of water-logged land toward the construction of the laterals which were necessary for the reclamation of such land, and which were planned to discharge into the Sulphur Creek wasteway. In 1912 several meetings of the local officials of the Reclamation Service with the county engineer and attorneys and landowners within the wet area were held for the consideration of a new drainage law. The essential features were agreed upon and drafted into a law by W. B. Bridgman, of Sunnyside, and passed by the State legislature early in 1913. The new law rectified many of the defects of the old laws. It provides for the issuance of bonds to be retired by gradual payments, for reassessment to provide for maintenance, for hearings to be held in the locality wherein work is to be done, etc., and, most important of all, that the county engineer is ex officio a member of the board of three directors in each district, thus providing for continuity of policy in each district and making much more probable the effective maintenance of the drains. Another unusual feature of the law is its provision that in fixing damages for rights of way benefits may be considered and used as an offset to the damages, thus avoiding the necessity for cash payments therefor.

The enactment of this law gave a marked impetus to the formation of drainage districts and the construction of drains, with a result that, since 1912, 15 drains, with a total length of 40 miles, have been completed, and 4 more drains are either proposed or under construction, involving the excavation of approximately 1,287,000 cubic yards of material, at a cost of approximately \$361,148, affecting 26,612 acres of land. Of the 19 drains mentioned, 13 discharge directly or indirectly into the Sulphur Creek wasteway. The construction of Sulphur Creek wasteway itself resulted in rendering adjacent lands fit for cultivation, and now some of these lands produce crops of corn and potatoes and others are used for pasture.

#### OPERATION AND MAINTENANCE.

The operation of the Sunnyside unit from July 1, 1914, to November 1, 1914, the close of the irrigation season, was on the whole successful and without incident except for accidents. Water was available for 81,807 acres of land and was served to 66,525 acres, comprised in 2,450 farms.

On July 13 the project was visited by a heavy rain and hail storm, which caused considerable damage to crops; flood water filled the canals, overflowing the banks, and resulted in several breaks. Fortunately the breaks were in all cases on the smaller canals and resulted in no great damage other than the necessary repair. On August 27 a young man, in swimming in the main canal, lost his life by drowning, and in order to find the body water was turned out of the canal for 24 hours.

The irrigation season of 1915 was started March 10, when a small head of water was turned into the canal for priming and puddling. This was gradually increased until April 5, when all deliveries desired

were made. The operation of the system to June 30, 1915, was without incident other than the ordinary routine. For the fiscal year 1915 the maximum head diverted from the river was 998 second-feet; the average, 765 second-feet; the actual delivered to the farms, 203,397 acre-feet. June 30, 1915, water was being delivered to 67,000 acres and was available for 81,807, classified as follows:

	Acres.
Piety Flat.....	580
Konnewock.....	3,080
Washington Irrigation Co.....	15,683
Washington Irrigation Co. and additional Government water right.....	28,310
Declared available by public notice.....	33,904
Served on rental basis.....	250
Total.....	81,807

*Maintenance.*—The maintenance work was done between the close of the 1914 irrigation season and the beginning of the 1915 irrigation season, at such time as the weather would permit. The work consisted of the correction and prevention of erosion, clearing weeds from canals and rights of way, cleaning of canals and laterals, renewal and repair of structures in the distribution system, the reconstruction of 3,000 feet of the Mabton siphon, and the lining with concrete of 1,800 feet of the Mabton lateral to prevent seepage.

The information above does not include data relative to the Snipes Mountain irrigation district or the Sunnyside irrigation district (Benton extension). Water was delivered to both districts in June, 1915, but was largely used for priming and testing canals and laterals, and regular service was not instituted prior to June 30.

*Historical review, Sunnyside unit.*

Item.	1910	1911	1912	1913	1914	1915
Acres for which service was prepared to supply water.....	61,245	71,756	80,076	80,807	81,807	81,807
Acres irrigated.....	48,266	51,040	58,560	62,800	66,525	67,000
Number of farms irrigated.....	1,818	2,221	2,441	2,450	2,450	2,450
Miles of canal operated.....	434	500	513	525	525	525
Water diverted (acre-feet).....	262,008	276,465	314,733	312,733	316,823	314,057
Water delivered to land (acre-feet).....	158,611	157,419	179,806	194,725	211,962	203,397
Per acre of land irrigated (acre-feet).....	3.287	3.064	3.062	3.101	3.185	3.036

**SETTLEMENT.**

The project shows a very good general development. An increase is noted in the irrigable area of farms occupied. The immigration to the project has been small, but of a very satisfactory character. An increase of 5 per cent in farm population is in no small part due to a considerable movement from the local towns back to the land.

The total gross returns of \$2,858,000 is about \$40,000 in excess of last year's total. It should be noted that the gross returns for the project for this year and the six previous years have annually exceeded the whole cost of construction of the project. The reclamation extension act has proven a great relief to the farmers on the newer and less productive land. Acceptances have been filed by a large proportion of the landowners.



*Settlement data, Sunnyside unit.*

Item.	1913	1914	1915
Total number of farms on project.....	2,450	2,448	2,450
Population of.....	7,322	6,900	7,270
Number of irrigated farms.....	2,450	2,448	2,450
Operated by owners or managers.....	(1)	1,912	1,910
Operated by tenants.....	(1)	536	540
Population of.....	7,322	6,900	7,270
Number of towns.....	13	13	13
Population of.....	6,880	5,300	5,480
Total population in towns and on farms.....	14,202	12,200	12,730
Number of public schools.....	34	34	34
Number of churches.....	(2)	30	30
Number of banks.....	(2)	9	9
Total capital stock.....	(2)	\$260,000	\$255,000
Total amount of deposits.....	(2)	\$1,248,000	\$1,028,679
Total number of depositors.....	(2)	3,000	5,488

<sup>1</sup> No record kept.<sup>2</sup> Data not obtained in former years.

## PRINCIPAL CROPS.

The principal crops grown are fruits, including peaches, apples, pears, cherries, grapes, melons, etc.; forage crops, consisting principally of alfalfa, timothy, and clover or grain hay; and vegetables, of which potatoes are the principal crop; while cabbage, asparagus, tomatoes, eggplant, onions, and other garden products are being planted in increasing quantities, as their value and the methods of handling become better known.

As shown by the table of crop results for 1914, alfalfa hay is the largest crop in acreage and in gross value of return to the grower. The plowing under of alfalfa fields and the planting of that area to corn, potatoes, etc., were done generally throughout the project; but, in spite of this, an increase of slightly over 2,000 acres planted to alfalfa is shown as compared to 1913. The acreage planted to potatoes shows a decrease of about 20 per cent, and that planted to corn an increase of 30 per cent over the 1913 returns. The yield of all kinds of fruit was very heavy, but the rather poor prices realized by the grower the past three years have had a tendency to prevent any further development in fruit acreage. Even though the yield of all crops was better than normal and the average prices of hay, corn, and potatoes normal or better, the rather poor prices obtained for fruit in general, and apples in particular, bring the average returns per acre down to approximately \$58 per acre cropped as compared to \$61 in 1913 returns.

The marked tendency toward dairy lines noticed in the 1913 report has continued unabated. Cattle show an increase of approximately 20 per cent over the 1913, which showed 85 per cent increase over 1912. Hogs show an increase of approximately 50 per cent over the 1913 returns, which showed 115 per cent increase over 1912. The cooperative creameries at Sunnyside and Prosser have had a very successful season, and no doubt are largely responsible for the increased development of the dairy industry.

*Crop report, Sunnyside unit—Yakima project, Washington, year of 1914.*

Irrigated crop.	Area (acres)	Unit of yield.	Yields.		Values.		
			Total.	Average per acre.	Per unit of yield.	Total.	Per acre.
Alfalfa hay .....	26,164	Tons .....	130,820	5	\$7.25	\$948,445	\$36.25
Apples .....	7,168	Pounds .....	59,834,050	8,347	.012	718,009	100.16
Clover hay .....	802	Tons .....	2,406	3	8.50	20,461	25.50
Corn .....	6,004	Bushels .....	321,281	53.5	.71	228,834	37.98
Small fruit .....	586	.....	.....	.....	107.80	63,173	107.80
Garden .....	597	.....	.....	.....	112.37	67,083	112.37
Hay, except above .....	1,347	Tons .....	4,041	3	8.41	33,985	25.23
Hops .....	187	Pounds .....	487,450	2,606	.10	48,745	260.61
Pasture .....	2,448	.....	.....	.....	20.00	48,960	20.00
Peaches .....	1,165	Pounds .....	8,627,280	7,405	.014	120,782	103.67
Pears .....	857	do. ....	9,707,700	11,327	.015	145,615	169.91
Prunes .....	188	do. ....	3,091,040	16,440	.026	81,730	434.73
Potatoes .....	3,828	Bushels .....	882,400	230	.36	318,664	82.89
Wheat .....	481	do. ....	.....	.....	.....	14,369	29.87
Less duplicated areas .....	2,549	.....	.....	.....	.....	.....	.....
Total cropped acreage .....	49,273	Total and average .....	.....	.....	.....	2,858,845	58.02
Irrigated, not cropped:							
Young orchard .....	8,266						
Young alfalfa .....	1,776						
Town and building sites .....	5,087						
Irrigated without crop .....	3,250						
Less duplicated areas .....	3,600						
Grand total irrigated .....	64,052						

Areas.	Acres.	Farms.	Per cent of project.
Total irrigable area farms reported .....	66,525	2,450	60.0
Total irrigated area farms reported .....	64,052	2,450	57.8
Under water-right applications .....	25,352	810	22.9
Under rental contracts .....	38,700	1,640	34.9
Total cropped area farms reported .....	49,273	2,450	44.5

**TIETON UNIT.****CONSTRUCTION DURING THE FISCAL YEAR.**

*Canyon Division.*—The new design of spillway at wasteway No. 2 was installed by Government forces.

*Valley Division.*—Some enlargement and finishing work was done on main lateral G by Government forces.

*Tieton River storage.*—The Clear Creek Regulating Reservoir was constructed to the height for first development and has been filled and put into operation. The dam is a single arch type; height for first development, 35 feet; storage under first development, 2,000 acre-feet; thickness at the base, 10 feet 3 inches; radius at bottom, 104 feet 8½ inches; radius at top, 128 feet; length of arch, 160 feet; gravity section at each end. The first development contained 2,500 yards of concrete. A cottage 18 by 24 feet was built for a watchman.

*Bumping Lake.*—The timberland at the upper end of the lake, which was submerged, containing 100 acres, was cut, piled, and fired, and the remaining logs have been floated down and are being drawn out and piled by the donkey engine and then burned.

## OPERATION AND MAINTENANCE.

Of the total acreage on the project, 33,600 acres, 23,500 acres are being watered at the end of the 1915 fiscal year. Of this acreage 10,000 acres are receiving water on a rotation schedule of 7 days on and 7 days off. The remaining 13,500 acres are on a schedule of 7 days on and 14 days off, the deliveries being at the rate of 1 second-foot to 140 acres, continuous flow. It is estimated that 25,000 acres will be watered this season.

*Historical review, Tieton unit.*

Item.	1910	1911	1912	1913	1914	1915 <sup>1</sup>
Acreage for which service was prepared to supply water	10,082	19,378	34,700	34,000	34,000	33,600
Acreage irrigated.....	1,695	7,115	15,008	18,750	21,000	25,000
Miles of canal operated.....		166	260	335	335	335
Water diverted (acre-feet).....	7,830	22,698	47,675	59,509	65,000	69,500
Water delivered to land (acre-feet).....		6,311	33,811	42,539	45,000	44,015
Per acre of land irrigated (acre-feet).....	1.73	1.91	2.27	2.27	2.30	2.00

<sup>1</sup> Estimated.

## SETTLEMENT.

The general development on the Tieton unit during the past year has shown more than an average increase. The 1914 census shows a population on the project of 1,916. There were several new houses and barns, silos, and cisterns constructed. About 5,000 acres of new land have been cleared.

There is a marked increase in dairying and hog raising over the entire project. The county road crews have done considerable new work and have made some very needed improvements in the roads on the project. The farmers have been able to dispose of their products at a fair price, and in general the lands are becoming more productive and the farmers more prosperous.

*Settlement data, Tieton unit.*

Item.	1912	1913	1914	1915
Total number of farms on project.....	875	900	1,000	1,300
Population of.....	1,174	1,622	1,916	2,500
Number of irrigated farms.....	875	900	1,000	1,300
Population of.....	1,174	1,622	1,916	2,500
Number of towns (on and adjacent to project).....	7	7	7	7
Population of.....	14,000	15,300	18,000	20,000
Total population in towns and on far.....	15,174	16,922	19,916	22,500
Number of public schools.....	6	9	10	10
Number of churches <sup>1</sup> .....	3	3	3	3

<sup>1</sup> Not including schoolhouses at which services are held.

## PRINCIPAL CROPS.

About 8,000 acres are planted to fruit, of which the Tieton lands will eventually produce a large quantity. At present the main crops are alfalfa hay, grain (including corn, wheat, oats, and barley), vegetables (including potatoes, onions, and garden truck), small fruit, and hops. The 1915 crop promises to be the best yet obtained.

*Crop report, Tieton unit, Yakima project, Washington, year of 1914.*

Irrigated crop.	Area, acres.	Unit.	Yields.		Values.		
			Total.	Average per acre.	Per unit.	Total.	Per acre.
Alfalfa hay .....	5,370	Ton.....	18,850	3½	\$6.00	\$113,100	\$21.00
Alfalfa seed .....	8	Bushel.....	96	12	10.00	960	120.00
Apples .....	620	Pound.....	2,730,000	4,400	.02	54,600	88.00
Barley .....	500	Bushel.....	14,000	28	.90	12,600	25.00
Beans .....	75	do.....	1,420	19	2.40	3,430	45.00
Clover hay .....	430	Ton.....	1,180	2½	6.00	7,080	16.50
Clover seed .....	60	Bushel.....	180	3	10.00	1,800	30.00
Corn, Indian .....	1,522	do.....	45,000	29½	.75	33,750	22.00
Corn, fodder .....	140	Ton.....	1,120	8	2.00	2,240	16.00
Fruit, small .....	32	Pound.....	65,600	2,050	.05	3,280	100.00
Garden .....	230	do.....				11,500	50.00
Hay¹ .....	840	Ton.....	1,470	1½	8.50	12,500	15.00
Hops .....	296	Pound.....	367,400	1,400	.09	35,750	125.00
Oats .....	740	Bushel.....	30,450	41	.40	12,180	16.00
Onions .....	70	do.....	6,700	96	.30	2,010	29.00
Pasture .....	590	do.....				10,500	18.00
Peaches .....	215	Pound.....	1,553,000	7,200	.005	7,760	36.00
Pears .....	140	do.....	351,800	2,700	.01	3,520	27.00
Potatoes, common .....	3,880	Bushel.....	400,400	120	.30	120,120	36.00
Wheat .....	1,125	do.....	26,500	21	1.00	26,500	21.00
Less duplicated areas .....	443						
<b>Total cropped acreage.</b>	<b>15,920</b>		<b>Total and average.....</b>			<b>472,480</b>	<b>29.60</b>
<b>Irrigated, no crop:</b>							
Nonbearing orchard .....	6,280						
Fall seeding .....	1,265						
Ground fall plowed .....	106						
Miscellaneous .....	430						
Less duplicated areas .....	3,400						
<b>Grand total irrigated..</b>	<b>20,600</b>						

Areas.	Acres.	Farms.	Per cent of project.
Total irrigable area farms reported.....	22,700	900	67.5
Total irrigated area farms reported.....	20,600	800	61.0
Under water-right applications.....	20,600	800	61.0
Total cropped area farms reported.....	15,920	780	46.0

¹ Except alfalfa and clover hay—principally timothy and wheat hay.

**PUBLIC NOTICE DATED JANUARY 30, 1915.**

1. Notice is hereby given that the annual operation and maintenance charge for lands under the Sunnyside unit, Yakima project, Washington, receiving water by virtue of supplemental water-right contracts with the United States is hereby fixed for the season of 1915 and thereafter until further notice at \$1 per irrigable acre, due and payable in advance on March 1 of each year.

2. If such charge is unpaid on April 1 following the date when due, an interest charge at the rate of one-half of 1 per cent of the amount unpaid will be added thereto, and thereafter an additional charge of one-half of 1 per cent of the amount unpaid shall be added on the first day of each calendar month, if such charge with interest shall remain unpaid; and no water shall be delivered to the lands of any owner who shall be in arrears for more than one calendar year for the payment of any charge for operation and maintenance.

FRANKLIN K. LANE,  
Secretary of the Interior.

**PUBLIC NOTICE DATED MARCH 31, 1915.**

1. Under the terms of existing public notices and orders the operation and maintenance charges for the Sunnyside unit, Yakima project, Washington, become due March 1 of each year, in advance.

2. In pursuance of the provisions of the reclamation act of June 17, 1902 (32 Stat., 388), and acts amendatory thereof and supplemental thereto, and in particular the reclamation extension act of August 13, 1914 (38 Stat., 686), section 6 of which authorizes the Secretary of the Interior to fix the due date for operation and maintenance charges, notice is hereby given that the operation and maintenance charge for the said project, which under existing public notices will become due March 1, 1915, is advanced to and shall become due on March 1, 1916, and all operation and maintenance charges hereafter made against lands under the said project shall become due on March 1 of each year thereafter until further notice.

3. Hereafter no operation and maintenance charge shall be collected at the time water-right application is filed, but the first payment on account of operation and maintenance shall become due on March 1 of the year following the calendar year in which same was made: *Provided, however,* That if original homestead entry or original water-right application be filed after June 15 in any year, the first payment on account of operation and maintenance will not become due until March 1 of the second calendar year following the date of entry.

4. The discount for payment made on or before the due date and the penalties for failure to make payment before the first day of the third calendar month after the due date will be applied as provided in section 6 of the said reclamation extension act.

5. Each acre of land, whether irrigated or not, shall be charged with a minimum operation and maintenance charge of 80 cents, which will permit delivery of not more than 2 acre-feet per acre; for the first acre-foot additional at the rate of 25 cents per acre-foot, 60 cents for the second acre-foot, and should further quantities be needed they will be furnished at the rate of 80 cents per acre-foot.

6. The provisions of this public notice shall apply to all lands subject to public notice heretofore issued for the said project.

7. Except as hereinabove provided, all terms and provisions of existing public notices and orders for the said project shall remain unchanged.

A. A. JONES,  
*First Assistant Secretary.*

**PUBLIC NOTICE DATED JULY 27, 1915.**

1. In pursuance of the provisions of section 4 of the reclamation act of June 17, 1902 (32 Stat., 388), and acts amendatory thereof and supplementary thereto, and particularly the reclamation extension act of August 13, 1914 (38 Stat., 686), notice is hereby given that water is available from the Sunnyside unit in the irrigation season of 1915 and thereafter upon the filing of proper water-right application, for the irrigable lands shown on the following amended farm unit plats: Willamette meridian—T. 8 N., Rs. 22, 23, 24, and 25; T. 9 N., Rs. 22, 23, 24, and 25; T. 10 N., Rs. 21, 22, and 23; T. 11 N., Rs. 19,

20, and 21, approved by the Secretary of the Interior on June 23, 1915, and on file in the office of the project manager, United States Reclamation Service, and local land office at North Yakima, Wash.

2. A supplemental list showing all changes in the irrigable areas heretofore opened to irrigation, as well as the lands now open to water-right application and irrigation, has been filed in the project office at Sunnyside, Wash.

3. Water-right application for lands in private ownership may be made to the project manager, North Yakima, Wash., on and after the date of this notice. The limit of area for which water-right application may be made for lands in private ownership is fixed at 160 acres of irrigable land for each landowner.

4. The water-right charges for the said lands shall be of two kinds: (a) Charge of \$52 per irrigable acre for the building of the irrigation system termed the construction charge, the installments being due and payable as hereinafter provided; and (b) an annual charge for operation and maintenance due and payable March 1 of each year for the preceding irrigation season. The operation and maintenance charge for the irrigation season of 1915 shall be due on March 1, 1916, and shall be of the amounts and terms of payment provided in public notice of March 31, 1915, for said Sunnyside unit.

5. For all said lands for which public notice has not been heretofore issued, but which were on or before August 13, 1914, subject to the terms and conditions of the reclamation law, and for which water-right applications under the terms of the reclamation extension act shall be duly filed within six months from the date hereof, the first installment of the construction charge shall be due on December 1, 1915, and subsequent installments on December 1 of each year thereafter. The first 4 of such installments shall each be 2 per cent, the next 2 each 4 per cent, and the next 14 each 6 per cent of the construction charge.

6. For any landholder described in paragraph 5 who elects not to file acceptance by means of application under the reclamation extension act within the time limited by law, the first installment shall be due December 1, 1915, and the same shall consist of one-tenth of the construction charge, namely, \$5.20 per irrigable acre, and payment shall be made on account of operation and maintenance as provided in paragraph 4 hereof. Additional installments, each one-tenth of the construction charge, shall be due on December 1 of each year thereafter for nine years. Persons coming under the terms of this paragraph shall file water-right application on the form in use prior to the passage of the act of August 13, 1914.

7. For all lands which were not, on or before August 13, 1914, subject to the terms and conditions of the reclamation law, a payment of \$2.60 per irrigable acre on account of the construction charge, called the initial payment, must be made at the time of making water-right application. The remainder of the construction charge, to wit, \$49.40 per irrigable acre must be paid in 15 annual installments, the first 5 of which shall be \$2.60 each and the remaining installments \$3.64 each per irrigable acre. The first annual installment becomes due December 1 of the fifth calendar year after the year in which the initial installment is due. The subsequent annual installments become due December 1 of each year thereafter until fully paid.

8. For land described on said farm unit plats which is included in a water-right application heretofore filed the construction charge for the irrigable area added by the aforesaid list shall be payable in the same number of installments and in the same amounts per installment as the remainder of the lands included in the water-right application. The first of such installments shall become due on the same day as the first installment which becomes due hereafter for the other lands included in such water-right application and subsequent installments on the same day of each year thereafter until fully paid.

9. In all cases where water-right application for lands in private ownership or for lands held under entries not subject to said reclamation act shall not be made within one year from date of this notice, the construction charge for such land shall be increased 5 per cent each year until water-right application and an initial payment are made.

10. The lands hereby opened to irrigation shall be subject, so far as applicable, to the public notices and orders heretofore issued for lands under the Sunnyside unit.

11. Any water-right applicant may pay the whole or any part of the construction charge within a shorter period.

12. The method of determining the annual operation and maintenance charge, and the penalties for failure to pay the construction charge and the operation and maintenance charges when due and discount allowed for prepayment of operation and maintenance charges will be as provided by the act of August 13, 1914 (38 Stat., 686).

A. A. JONES,

*First Assistant Secretary of the Interior.*

**PUBLIC NOTICE DATED MARCH 19, 1915.**

1. Under the terms of existing public notices and orders, the operation and maintenance charges for the Tieton unit, Yakima project, Washington, become due on April 1 of each year in advance.

2. In pursuance of the provisions of the reclamation act of June 17, 1902 (32 Stat., 388), and acts amendatory thereof and supplemental thereto, and in particular the reclamation extension act of August 13, 1914 (38 Stat., 686), section 6 of which authorizes the Secretary of the Interior to fix the due date for operation and maintenance charges, notice is hereby given that operation and maintenance charge for the said project, which, under existing public notices, will become due on April 1, 1915, is advanced to and shall become due on March 1, 1916, and all operation and maintenance charges hereafter made against lands under the said project shall become due on March 1 of each year thereafter until further notice.

3. Hereafter no operation and maintenance charge shall be collected at the time water-right application is filed, but the payment on account of operation and maintenance shall become due on March 1 of the year following the calendar year in which entry or water-right application was made, provided, however, that if original homestead entry or original water-right application be filed after June 15 in any year, the first payment on account of operation and maintenance will not become due until March 1 of the second calendar year following the date of entry.

4. The discount for payment made on or before the due date and the penalties for failure to make payment before the first day of the third calendar month after the due date will be applied, as provided in section 6 of the said reclamation extension act.

5. The operation and maintenance charges for the irrigation season of 1915 shall be due March 1, 1916, and each acre of irrigable land, whether irrigated or not, shall be charged with a minimum operation and maintenance charge of \$1.25, which will permit delivery of not more than 1 acre-foot per acre. For the first acre-foot additional a charge of 25 cents will be made, and should further quantities be needed they will be furnished at the rate of 75 cents per acre-foot.

6. The provisions of this public notice shall apply to all lands subject to public notices heretofore issued for the said project.

7. Except as hereinabove provided, all the terms and provisions of existing public notices and orders for the said project shall remain unchanged.

A. A. JONES,  
*First Assistant Secretary.*

### FINANCIAL STATEMENTS.

*Assets, liabilities, and capital, Yakima Storage unit to June 30, 1915.*

#### ASSETS.

Cash in employees' hands awaiting transfer to fiscal agent.....	\$837. 04
Accounts receivable, uncollected miscellaneous items.....	64, 022. 30
Inventories:	
Mercantile stores stock on hand .....	\$6, 653. 38
Mechanical and other equipment.....	116, 670. 90
Materials and supplies on hand in storehouses.....	57, 708. 08
Unadjusted transfers between projects.....	204. 85
Total.....	181, 237. 21
Construction work in process:	
Gross expenditures for construction of project to date. \$1,819,378.34	
Less revenues earned during construction, as follows:	
Rental of buildings.....	\$16, 030. 55
Rental of grazing lands.....	51. 00
Rental of power and light.....	805. 62
Rental of irrigation water.....	14, 305. 00
Rental of telephones.....	15. 20
Miscellaneous revenues.....	47, 189. 90
Profit on mess houses.....	32, 334. 62
Profit on mercantile stores.....	11, 457. 19
Profit on hospital.....	1, 290. 39
Profit on picture show.....	443. 54
Adjustments—Westcott suspended-	
contract costs.....	45, 290. 57
Total deductions.....	169, 213. 58
Net expenditures for construction of project to date.....	1, 650, 164. 76
Total assets.....	1, 896, 261. 31

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## LIABILITIES, RESERVES, AND CAPITAL.

Accounts payable:		
Unpaid labor.....	\$25,346.52	
Unpaid purchases.....	35,196.12	
Unpaid freight and express.....	6,749.66	
Unpaid passenger fares.....	179.75	
Unredeemed coupon books.....	342.00	
Total.....		\$67,814.05
Miscellaneous accruals—charges accrued on contracts with Indian Service.....		100,000.00
Net Investment:		
Disbursements.....	\$1,739,122.85	
Transfers received from other projects.....	181,857.61	
		\$1,920,980.46
Less:		
Collections.....	162,645.74	
Transfers issued to other projects.....	29,887.46	
		192,533.20
Total.....		1,728,447.26
Total liabilities, reserves, and capital investment of the Government.....		1,896,261.31

*Functional feature costs of Yakima Storage unit to June 30, 1915.*

Examination and surveys.....		\$309,858.05
Storage system:		
Dam—		
Kachess.....	\$445,311.90	
Keechelus.....	733,306.96	
Clealum.....	74,121.82	
		\$1,252,740.68
Spillway—		
Kachess.....	35,559.72	
Keechelus.....	30,468.55	
		66,028.27
Conduit—Keechelus.....		113,134.90
		1,431,903.85
Permanent structures and land:		
Buildings—		
Kachess.....	2,667.90	
Keechelus.....	2,547.61	
		5,215.51
Roads:		
Keechelus.....	7,948.38	
Tieton Reservoir.....	17,049.13	
		24,997.51
Real estate:		
Kachess.....	5,692.46	
Keechelus.....	227.17	
Clealum.....	18,218.70	
		24,138.33
		54,351.35
Telephone system:		
Kachess.....	1,008.07	
Keechelus.....	2,428.58	
		3,436.65
Stores and other operations:		
Kachess.....	277.50	
Keechelus.....	19,550.94	
		19,828.44
Gross expenditures for construction of project to date.....		1,819,378.34

*Estimated cost of contemplated work, Yakima-Storage unit, during fiscal year 1916.***Examination and surveys:**

Kachess.....	\$325.00	
Keechelus.....	1,300.00	
Clealum.....	2,775.00	
Tiston Reservoir.....	500.00	
Hydrographic survey.....	100.00	
Hydrographic investigations.....	8,900.00	
		\$13,900.00

Storage system..... 406,200.00

**Telephone system:**

Kachess and Keechelus.....	\$1,600.00	
Operation and maintenance during construction.....	8,300.00	
		9,900.00

**Stores and other operations (reimbursable accounts):**

Mess house.....	97,150.00	
Mercantile stores.....	32,200.00	
Moving picture show.....	650.00	
		130,000.00

Total..... 560,000.00

*Assets, liabilities, reserves, and capital, Yakima-Sunnyside unit, to June 30, 1915.***ASSETS.**

Cash with employees for transfer to special fiscal agent..... \$83.09

**Accounts receivable:**

Construction charges due and uncollected from water-right applicants.....	\$60,128.01	
Construction charges unaccrued on contracts with water-right applicants.....	931,716.46	
Operation and maintenance charges due and uncollected from water-right applicants.....	31,066.46	
Uncollected rentals of irrigation water.....	43.80	
Uncollected contractor's freight refunds.....	937.48	
Uncollected miscellaneous items.....	970.96	
		1,024,863.17

**Inventories:**

Mercantile stores, stock on hand.....	71.87	
Government animals.....	793.63	
Mechanical and other equipment.....	10,119.33	
Materials and supplies on hand in storehouses.....	16,465.12	
Unadjusted transfer vouchers between projects.....	1,079.71	
Undistributed credits (freight and handling).....	<sup>1</sup> 1,828.43	
		26,701.23

**Construction work in process:**

Gross expenditures for construction of project to date.....	2,764,378.76	
Less revenues earned during construction as follows:		
Contractors' freight refunds.....	\$9,824.35	
Forfeitures by defaulting contractors.....	5,311.16	
Rentals, tents, and bunks.....	2,335.67	
Profits on mess houses.....	5,840.79	
Profits on mercantile stores.....	2,877.13	
Profits on hospital.....	2,174.92	

Total deductions..... 28,364.02

Deferred operation and maintenance charges..... 42,746.67

Total assets..... 3,830,408.90

<sup>1</sup> Deduct.

## LIABILITIES, RESERVES, AND CAPITAL.

## Accounts payable:

Unpaid progress earnings under construction contracts.....	\$26,277.16
Unpaid contract holdbacks.....	504.52
Unpaid labor.....	21,888.68
Unpaid purchases.....	19,913.66
Unpaid freight and express.....	8,918.00
Unpaid passenger fares.....	287.25
Unpaid agreements to purchase real estate.....	100.00
Unredeemed coupon books.....	4.90
Unpaid miscellaneous.....	2,898.20

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\$80,792.37

## Reserves for repayment to reclamation fund of cost of project:

Value of construction contracts with water-right applicants.....	1,625,122.53
Construction charges paid in advance by water-right applicants.....	5,587.30
Penalties on construction charges paid by water-right applicants.....	4,158.92

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1,634,868.75

## Net investments:

Disbursements.....	\$3,377,600.45
Transfers received from other projects.....	21,383.51
	<hr/> 3,398,983.96

## Less—

Collections.....	1,207,603.78
Refund repayments.....	2,397.05
Transfers issued to other projects.....	74,235.35
	<hr/> 1,284,236.18

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2,114,747.78

## Total liabilities, reserves, and capital investment of the Government.....

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3,830,408.90*Functional feature costs of Yakima-Sunnyside unit to June 30, 1915.*

Examination and surveys.....	\$45,918.42
Canal system.....	1,653,066.97
Lateral system.....	873,216.25
Drainage system.....	11,418.80
Power system.....	99,867.14
Farm units.....	21,506.62
Permanent structures and land.....	36,128.55
Telephone system.....	13,848.61
Operation and maintenance charges compounded with construction ..	8,148.46
Stores and other operations.....	1,258.94
Total.....	<hr/> 2,764,378.76

*Operating revenues and expenses Yakima-Sunnyside unit to June 30, 1915.*

## EXPENSES.

Storage system:	
Operation.....	\$1,077.27
Maintenance.....	3,962.38
Canal system:	
Operation.....	116,624.89
Maintenance.....	201,841.54
Lateral system:	
Operation.....	80,347.53
Maintenance.....	169,082.35

## Undistributed expenses:

Operation, telephone lines.....		\$496. 87
Maintenance, telephone lines .....	\$1, 374. 15	
Buildings.....	2, 447. 75	
General expense.....	28, 734. 17	
		<hr/> 32, 556. 07
Less accrued and unpaid operation and maintenance charges compounded with construction charges.....		<sup>1</sup> 8, 148. 46
Total.....		<hr/> <hr/> 597, 840. 44

## REVENUES.

Operation and maintenance charges accrued on contracts with water-right applicants.....	507, 974. 25
Operation and maintenance charges paid in advance by water-right applicants.....	851. 27
Penalties on operation and maintenance water-right charges.....	3, 158. 06
Rentals of buildings.....	1, 535. 40
Rentals of power and light.....	1, 989. 20
Rentals of irrigation water.....	38, 437. 52
Miscellaneous revenues.....	1, 148. 07
Deferred operation and maintenance revenues (carried to debit side of assets and liabilities statement).....	42, 746. 67
Total.....	<hr/> <hr/> 597, 840. 44

*Estimated cost of contemplated work, Yakima-Sunnyside unit, fiscal year 1916.*

Examination and surveys.....	\$2, 500. 00
Canal system.....	9, 200. 00
Lateral system:	
General.....	\$19, 100. 00
Outlook.....	67, 620. 00
Sunnyside district.....	3, 400. 00
	<hr/> 90, 120. 00
Power system:	
Snipes Mountain.....	14, 000. 00
Outlook.....	32, 220. 00
	<hr/> 46, 220. 00
Farm units.....	1, 700. 00
Operation and maintenance.....	97, 500. 00
Stores and other operations (reimbursable accounts).....	4, 100. 00
Unallotted to features.....	26, 760. 00
Total.....	<hr/> <hr/> 278, 100. 00

*Assets, liabilities, reserves, and capital, Yakima-Tieton unit, to June 30, 1915.*

## ASSETS.

Cash with special fiscal agent for deposit.....	\$20. 55
Accounts receivable:	
Construction charges due and uncollected from water-right applicants.....	\$15, 830. 16
Construction charges unaccrued on contracts with water-right applicants.....	2, 337, 995. 43
Operation and maintenance charges due and uncollected from water-right applicants.....	154. 58
	<hr/> 2, 353, 980. 17
Inventories:	
Mercantile stores, stock on hand.....	211. 33
Government animals.....	807. 50
Mechanical and other equipment.....	8, 942. 59
Materials and supplies on hand in storehouses.....	3, 760. 68
Unadjusted transfers between projects.....	<sup>1</sup> 1, 810. 35
Undistributed credit (freight and handling).....	<sup>1</sup> 2, 297. 98
	<hr/> <hr/> 9, 613. 77

<sup>1</sup> Deduct.

Construction work in process—gross expenditures for construction of project to date.....	\$3, 154, 145. 92	
Less revenues earned during construction as follows:		
Rentals of buildings.....	\$4, 827. 35	
Rentals of irrigation water.....	3, 526. 50	
Contractors' freight refund.....	5, 092. 12	
Loss on mess houses.....	<sup>1</sup> 934. 21	
Profits on mercantile stores.....	9, 985. 83	
Profit on hospital.....	1, 992. 83	
Total deductions.....	24, 490. 42	
Deferred operation and maintenance charges.....		\$3, 129, 655. 50
		14, 811. 08
Total assets.....		<u>5, 508, 081. 07</u>

## LIABILITIES, RESERVES, AND CAPITAL.

Accounts payable:			
Unpaid labor.....	\$2, 831. 42		
Unpaid purchases.....	2, 427. 52		
Unpaid freight and express.....	434. 87		
Unpaid passenger fares.....	168. 34		
Unredeemed coupon books.....	21. 60		
			5, 883. 75
Reserves for repayment to reclamation fund of cost of project:			
Value of construction contracts with water-right applicants.....	2, 571, 263. 75		
Value of construction contracts with water-right applicants temporarily suspended.....	6, 417. 00		
Construction charges paid in advance by water-right applicants.....	867. 05		
Penalties on construction charges paid by water-right applicants.....	412. 26		
			2, 578, 980. 06
Net investment:			
Disbursements.....	\$3, 218, 538. 20		
Transfers received from other projects.....	460, 001. 78		
		3, 678, 539. 98	
Less—			
Collections.....	425, 452. 36		
Refunds, repayment.....	762. 60		
Transfers issued to other projects.....	329, 087. 76		
		755, 302. 72	
			2, 923, 237. 26
Total liabilities, reserves, and capital.....			<u>5, 508, 081. 07</u>

*Functional feature costs of Yakima-Tieton unit to June 30, 1915.*

Examination and surveys.....	\$69, 694. 56
Storage works.....	630, 964. 54
Canal system.....	1, 187, 161. 54
Lateral system.....	1, 168, 374. 33
Permanent structures.....	44, 712. 55
Telephone system.....	25, 148. 78
Operation and maintenance during construction.....	10, 208. 54
Operation and maintenance charges compounded with construction charges.....	16, 932. 44
Stores and other operations.....	948. 64
Total.....	<u>3, 154, 145. 92</u>

<sup>1</sup> Deduct.

*Operating revenues and expenses, Yakima-Tieton unit, to June 30, 1915.***EXPENSES.**

Storage system:	
Operation.....	\$5,301.89
Maintenance.....	1,589.88
Canal system:	
Operation.....	9,506.69
Maintenance.....	16,695.47
Lateral system:	
Operation.....	45,704.78
Maintenance.....	61,452.82
Undistributed expense:	
Operation.....	9,065.14
Maintenance.....	11,945.00
Costs ledger inventories.....	37.95
	<hr/>
	161,299.62
Less accrued and unpaid operation and maintenance charges com- pounded with construction charges.....	16,932.44
	<hr/>
Total.....	144,367.18

**REVENUES.**

Operation and maintenance charges accrued on contracts with water- right applicants.....	124,791.05
Operation and maintenance charges paid in advance by water-right applicants.....	327.13
Operation and maintenance water-right charges forfeited.....	3.00
Discount allowed on operation and maintenance water-right charges..	<sup>1</sup> 13.46
Rentals of buildings.....	4,226.38
Rentals of irrigation water.....	222.00
Deferred operation and maintenance revenues (carried to debit side of assets and liabilities statement).....	14,811.08
	<hr/>
Total.....	144,367.18

*Estimated cost of contemplated work, Yakima-Tieton unit, fiscal year 1916.*

Storage system.....	\$3,800.00
Operation and maintenance.....	46,000.00
Stores and other operations (reimbursable accounts).....	2,200.00
	<hr/>
Total.....	52,000.00

*Assets, liabilities, reserves, and capital, Wapato, Benton, and Kittitas units of the Yakima project, June 30, 1915.***ASSETS.**

Building work in progress:	
Gross building expenses to date—	
Wapato.....	\$36,465.77
Benton.....	11,167.45
Kittitas.....	19,366.90
	<hr/>
	\$67,000.12
Deductions—Rentals of grazing lands.....	62.40
	<hr/>
Net building expenses of units to date.....	66,937.72
	<hr/>
Total assets.....	66,937.73

<sup>1</sup> Deduct.

## LIABILITIES, RESERVES, AND CAPITAL.

Net investment;		
Disbursements.....	\$66,979.41	
Transfers received from other projects.....	20.71	
	<hr/>	\$67,000.12
Less collections and transfers issued to other projects.....		62.40
		<hr/>
Total liabilities, reserves, and investment of the Government.....		<u>66,937.72</u>

*Principal feature costs of Wapato, Benton, and Kittitas units to June 30, 1915.*

Miscellaneous preliminary investigations (gross building expenses of units to date).....	\$67,000.12
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## WYOMING, SHOSHONE PROJECT.

G. O. SANFORD, project manager, Powell, Wyo.

### LOCATION.

Counties: Park and Big Horn.

Townships, 52 to 58 N., Rs. 97 to 104 W., sixth principal meridian.

Railroad: Chicago, Burlington & Quincy.

Railroad stations and estimated population January 1, 1915: Cody, 1,300; <sup>1</sup> Corbett;

<sup>1</sup> Deaver; <sup>2</sup> Ralston; Powell, 450; Garland, 40; <sup>1</sup> Mantua; and <sup>1</sup> Frannie, Wyo.

### WATER SUPPLY.

Source of water supply: Shoshone River.

Area of drainage basin: 1,380 square miles.

Annual run-off in acre-feet: Shoshone River near Cody (1,380 square miles), 1903 to 1914—maximum, 1,420,000; minimum, 913,150; mean, 1,151,292.

### AGRICULTURAL AND CLIMATIC CONDITIONS.

Area for which service is prepared to supply water, season of 1915: 41,098 acres.

Works constructed for fifth unit, but not open to entry: 3,562 acres.

Area under water-right applications, season of 1915: 30,897 acres.

Area under rental contracts, season of 1915: 150 acres.

Length of irrigating season: From April 20 to October 20—180 days.

Average elevation of irrigable area: 4,500 feet above sea level.

Average annual rainfall on irrigable area: 1907-1914, 5.58 inches; 1914, 5.23 inches.

Range of temperature on irrigable area: -31° to 101° F.

Character of soil of irrigable area: Light sandy and clay loams.

Principal products: Alfalfa, grain, sugar beets, vegetables, cattle, and hogs.

Principal markets: Omaha, Nebr.; Kansas City, Mo.; Chicago, Ill.; Denver, Colo.; Billings, Mont.; and local.

### LANDS OPENED FOR IRRIGATION.

Dates of public notices and orders relating thereto: November 25, 1907; April 3, 1908; May 8, 1909; February 6, March 25, May 20, November 8, 1911; February 9, March 23, July 17, 1912; January 17, February 26, June 23, July 15, July 21, 1913; January 19, May 29 (memorandum), September 24, 1914; March 1, March 20, 1915.

Location of lands opened: Tps. 54 to 56 N., Rs. 98 to 100 W., sixth principal meridian.

Present status of irrigable lands opened: 30,072.04 acres of public and 825.15 acres of private lands under water-right application, 8,095.66 acres of unentered public land, and 1,807 acres of private and State land open to entry for which water is available, but for which no water-right application has been made; 298.44 acres of land included in United States reserves.

Limit of area of farm units: Public, 80 acres; private, 160.

Duty of water: 2 acre-feet per acre per annum at the farm.

Building charge per acre of irrigable land: \$50 on first unit, \$51 on second unit, and \$52 on third and fourth.

Annual operation and maintenance charge: 50 cents per acre of irrigable land whether water is used or not for which one acre-foot of water may be delivered; 50 cents per acre-foot for additional water.

### CHRONOLOGICAL SUMMARY.

Reconnaissance made and preliminary surveys begun in 1903.

Construction recommended by board of engineers February 1, 1904.

Construction authorized by Secretary February 10, 1904.

<sup>1</sup> Railroad sidings only.

<sup>2</sup> Population less than 25.



Corbett diversion dam completed June, 1907.

Corbett Tunnel completed November, 1907.

First irrigation by Reclamation Service, season of 1908.

Shoshone Dam completed January, 1910.

Entire project 50 per cent completed June 30, 1915; first, second, third, fourth, and fifth units completed.

### IRRIGATION PLAN.

The irrigation plan of the Shoshone project provides for the storage of flood waters of Shoshone River in a Reservoir controlled by Shoshone Dam, about 8 miles above Cody, Wyo.; the diversion of water from Shoshone River by a dam at Corbett, about 16 miles below the reservoir, and through the Corbett Tunnel into a canal system supplying water to lands on the north side of the river in the vicinity of Ralston, Powell, Garland, Mantua, and Frannie; the diversion into the Willwood Canal for the irrigation of lands on the south side of the Shoshone River; and the diversion into the north side High Line from the Shoshone Dam for the irrigation of lands lying on the north side of the Shoshone River above the Garland Canal system and extending from the lower end of the Shoshone Canyon near Cody to the divide between the Shoshone River and Clarks Fork drainage.

The United States claims all waste, seepage, spring, and percolating water arising within the project, and proposes to use such water in connection therewith.

The Shoshone Dam, Corbett Dam, Corbett Tunnel, Garland Canal, about 12 miles of the Frannie Canal, and the lateral and distributary system for approximately 44,000 acres in the vicinity of Ralston, Powell, and Garland, Wyo., have been completed.

Future operations include the construction of the High Line Canal, the Willwood Canal, and the extension of the Frannie Canal to cover lands in the vicinity of Frannie, Wyo.

### CONSTRUCTION DURING FISCAL YEAR.

*Shoshone Dam controlling works.*—The original plans for controlling works, Shoshone Dam, provided for the installation of sliding-pressure gates in the lower outlet tunnel, which were installed at the time the dam was constructed. These gates were not intended to be operated under a depth of water of more than 150 feet. When the reservoir is full the depth of water over the gates is 220 feet. In order to provide additional controlling works a second tunnel was driven around the right abutment of the dam at a distance of 120 feet below full reservoir level. No controlling works were ever installed and the tunnel has been temporarily closed by means of a concrete plug. The development of the project required the installation of additional controlling works which could be operated when the reservoir was full, and a decision was reached to install two 58-inch Ensign balanced valves in the lower outlet tunnel. The plans covered the erection of a removable steel bulkhead 90 feet downstream from the high-pressure gates, and between these gates and the bulkhead the balanced valves were located, with two outlets driven through the rock into the canyon. The work of installing the valves was performed by Government forces, beginning in August, 1914, and carried on continuously until completion in May, 1915. The valves in question have a positive control and can be operated so as to discharge any desired quantity of water up to about 2,000 cubic feet per second, which is considered ample for the requirements for the irrigation of lands below Shoshone Dam.

*Alkali Creek inclined drop.*—In the Thirteenth Annual Report there appears a description of Alkali Creek inclined drop. Work on this drop was started during the fiscal year 1914, and was 90 per cent completed on June 30, 1914. By means of a temporary wooden intake this structure was used to carry a portion of the water required during the irrigation season of 1914. Work was resumed on the

structure immediately after the close of the irrigation season and completed early in December. The structure has been successfully operated throughout the first half of the operating season of 1915.

### DRAINAGE.

The investigations which have been made heretofore in connection with the water-logged areas on the Shoshone project were sufficient to outline definitely the seeped areas and determine what works were required for the relief and protection of seeped and threatened areas. The construction of subsurface drains was carried on actively during the first portion of the fiscal year 1915 by the use of one Austin trencher and also one dragline excavator, which was used in connection with the construction of open subsurface drains and the deepening of Bitter Creek. This was deemed necessary for the relief of seeped lands adjacent to the creek, and also to provide better outlets for the closed tile drains that had been constructed previously. The provisions of the reclamation extension act required that, before any new work could be undertaken which would result in an increase in the construction charge, the majority of the landowners and water users must agree to the repayment of such charges as might be necessary in carrying on new work, and on this project drainage is the most important item which must be covered by increased construction charges. The question was therefore submitted to the water users in May, 1915. The result of this ballot was favorable to the repayment of an increased construction charge of \$7 per acre paid in additional installments after the 20 years contemplated by the extension act. Authority was immediately given to continue with drainage work, and this has been done by the use of the Austin trencher and drag line excavator, which were in use the previous year. Both these machines are being worked double shifts each day. During the fiscal year there were constructed 8.88 miles of closed tile drains, and 1.98 miles of open drains, making the total to June 30, 1915, 38.84 miles of closed tile drains and 8.96<sup>1</sup> miles of open drains. The extensions to the drainage system have resulted in a general lowering of the water surface throughout the area tributary to the drains and in the unwatering of tracts that were so saturated that it was almost impossible to walk across them. The areas that have been reclaimed usually require two years before the alkali salt that had accumulated on the surface is removed from the zone of plant growth to such an extent as to render the land productive. Areas that two and three years ago were white with alkali salts are now producing fair crops, with promise of increased productivity under proper cultivation. On other portions of the project that have not been reached by constructed drains the water table is high, and there are many valuable farms that are threatened with a loss of crop unless the drainage system can be extended to protect these areas. It is therefore considered necessary that the drainage work be prosecuted actively until all threatened lands have been protected or until such time as the expenditures if required shall have reached the amount which the water users have agreed to repay in the increased building charge of \$7 per acre.

<sup>1</sup> The reduction in mileage of open drains is due to a reclassification of drains in which drain H, which had heretofore been classified as an open subsoil drain, is now included as a surface waste water ditch (Drain H, 2.15 miles.)

The drainage system on the Shoshone project has been very successful and large quantities of water have been removed by means of the subsurface drains. Because of the gravelly subsoil it was expected that considerable water would have to be removed, the general assumption being that about 25 per cent of the water applied to the land would be taken away by the drains. It has been found from careful observation and computation that the drains have removed as high as 40 per cent of the total quantity of water delivered to the land and lost from the canal system as it passes through the area tributary to any particular drain. As a result of this excessive quantity, which the drains have to carry, some of the drains are overloaded along the lower portions, especially during the height of the irrigation season. It has been necessary to construct some relief drains for portions of the system that have already been constructed, and in other portions of the system additional relief drains will be required.

During the fiscal year 1916 the authorized expenditure for continuing drainage work is \$68,910, which, however, is not sufficient to carry on the construction of subsurface drains by operating both excavating machines two shifts per day, and unless additional money can be provided it will be necessary to discontinue one of the double shifts on the Austin trencher, which will reduce the desired progress to about 50 per cent of what was hoped could be made. The following statement shows the extent of the area affected by seepage from the year 1910 to 1915, inclusive:

Item.	1910	1911	1912	1913	1914	1915 <sup>1</sup>
Acreage too wet to cultivate.....	255	874	2,014	1,973	1,439	974
Acreage so affected as to materially reduce crop yields.....	87	655	1,316	878	878	1,068
Number of farm units affected.....	29	111	180	174	176	171

<sup>1</sup> To June 30, 1915.

#### OPERATION AND MAINTENANCE.

The operation of Shoshone Dam, Corbett Diversion Dam, and the main supply (Garland) canal, with its 10 main laterals and 83 sub-laterals, aggregating 245 miles in length, have been operated during the fiscal year, and satisfactory service has been given in practically all instances. With a few exceptions the water is now delivered to the water users as requested. The canal system is not large enough to deliver all the water requested to all of the farms at the same time, but has sufficient capacity to deliver twice as much water to each farm during the irrigation season as can be beneficially used. In order to facilitate the successful operation of the system it seems very necessary that some prescribed method of delivery by rotation be installed, and the necessity of such a change is realized on some portions of the project where it is being tried out during the operating season of 1915. On other portions of the project the water users are following a modified system of rotation in order to have an effective irrigating head delivered, and are willing to wait for one person to complete the irrigation of his farm before delivery is begun on some other farm. One of the grave questions that confronts the management is that of waste water. The provisions of the extension act

requiring that payments be made for the quantity of water used is having some restraining influence on excessive waste, but not as much as was hoped or desired. As the area of the land under irrigation is increased and new farms are entered, the problem of the disposal of waste water becomes more complicated, and a good many difficulties have been referred to the management in attempting to arrive at some satisfactory solution in the disposal of waste water into some natural drainage channel. These questions are being given consideration by all of the water users, and indications now point to the possibility of reaching a satisfactory adjustment prior to the operating season of 1916. There is reason to believe that as the water users become more experienced and get their farms in better shape the surface waste will be materially reduced.

*Historical review, Shoshone project.*

Item.	1910	1911	1912	1913	1914	<sup>1</sup> 1915
Acres for which service is prepared to supply water.....	30,898	34,898	41,332	41,309	41,168	41,098
Acres irrigated.....	14,701	16,216	16,524	19,423	22,226	25,600
Number of farms irrigated.....	275	322	346	396	420	460
Miles of canal operated.....	110	210	242	242	245	247
Water diverted (acre-feet).....	48,241	54,862	50,100	60,767	92,340	41,943
Water delivered to land (acre-feet).....	30,351	35,787	27,370	40,436	52,789	21,681
Per acre of land irrigated (acre-feet).....	2.05	2.20	1.66	2.08	2.38	0.85

<sup>1</sup> To June 30, 1915.

**SETTLEMENT.**

During the fiscal year 173 town lots in the town of Powell were sold. The money thus returned to the reclamation fund from the sale of town lots amounts to \$28,212.50, bringing the total return to June 30, 1915, to \$60,127.50. On July 10, 1914, a public sale of town lots resulted in the disposal of 60 lots for \$12,537.50. During the months of March and April, 1915, town-lot sales were very brisk, a total of 101 lots being sold for \$13,800. Most of the business lots in Powell town site have been disposed of.

Attention may properly be called to the character of buildings erected during the past fiscal year. Several brick structures have been erected at prices ranging from \$3,000 to \$12,000 each. All the buildings are of a substantial character and speak well for the future of the town.

During the fiscal year there has been a net increase of 75 filings, aggregating 5,231.62 acres. Eighty-eight filings were made, of which 13 were relinquishments. In addition, water rights for 295.12 acres of land in private ownership were executed. There were no cancellations for the nonpayment of charges. Since the passage of the reclamation extension act the rate of filings has increased rapidly, until at the present time there remain only 107 vacant units open to homestead entry. During March, 1915, 21 filings were made, aggregating 1,353.82 acres of irrigable land. This was the highest number of filings for any one month.

Lateral A extension, of about 3,500 acres, lying about 5 miles north and northwest of Powell, was completed June 1, 1915. This new unit will add 41 farm units to the project. From present indications this land will be filed upon as soon as opened to entry.

*Settlement data, Shoshone project.*

Item.	1912	1913	1914	1915
Total number of farms on project.....	612	615	616	609
Population of.....	11,700	11,279	11,400	11,500
Number of irrigated farms.....	360	396	424	460
Operated by owners or managers.....	.....	349	359	363
Operated by tenants.....	.....	47	65	97
Population of.....	11,700	11,279	11,400	11,500
Number of towns.....	3	3	3	3
Population of.....	1,500	1,515	1,525	1,515
Total population in towns and on farms.....	12,200	11,794	11,925	12,015
Number of public schools.....	6	6	6	6
Number of churches.....	6	6	6	7
Number of banks.....	3	3	3	3
Total capital stock.....	\$60,000	\$60,000	\$60,000	\$60,000
Total amount of deposits.....	\$125,000	\$146,000	\$156,664	\$177,228
Total number of depositors.....	800	850	1,037	1,290
Number of relinquishments.....	34	16	14	13

1 Estimated.

**PRINCIPAL CROPS.**

During the season of 1914, 22,226 acres were irrigated, of which 20,905 acres were cropped. The gross returns therefrom amounted to \$313,826.30, or an average of \$15.01 per acre. Alfalfa is still the principal crop on the project. In 1914 there were 118 acres of sugar beets harvested. This year the area has been increased to 1,176 acres. This crop has made a very fine showing and promises to return a handsome profit to the farmers. Two sugar-beet dumps have been constructed on the project, and the Billings Sugar Beet Co. has promised to erect other dumps along the railroad track as fast as additional areas are placed in this crop. In addition to this development an alfalfa mill has been erected at Garland, which will give the farmers on the easterly portion of the project an opportunity to dispose of their alfalfa with a very much reduced length of haul.

*Crop report, Shoshone project, Wyoming, year of 1914.*

Irrigated crop.	Areas, acres.	Unit.	Yields.		Values.		
			Total.	Average per acre.	Per unit.	Total.	Per acre.
Alfalfa hay.....	12,627	Tons.....	29,638	2.35	\$6.50	\$192,647	\$15.26
Alfalfa seed.....	83	Bushels...	117.8	1.42	12.00	1,414	17.08
Apples.....	5	Pounds...	350	700	.04	14	28.00
Barley.....	930	Bushels...	16,921	18.19	.85	14,333	15.47
Beans.....	4	do.....	4.17	1.04	3.00	13	3.12
Beets, sugar.....	118.5	Tons.....	1,041	8.78	6.65	6,923	58.42
Clover hay.....	17	do.....	23	1.35	6.50	149	8.79
Clover seed.....	22.75	Bushels...	17.5	.77	12.00	210	9.23
Corn, Indian.....	2.75	do.....	45	16.36	.50	22	8.18
Corn fodder.....	2.25	Tons.....	5	2.22	5.00	25	11.11
Fruits, small.....	1.5	Pounds...	140	93.33	.25	35	23.33
Garden.....	130.75	.....	.....	.....	.....	7,450	56.98
Hay.....	94	Tons.....	82	.87	6.50	533	5.67
Millet seed.....	1	Bushels...	15	15	.40	6	6.00
Oats.....	3,825.75	do.....	93,644	24.48	.50	46,822	12.24
Onions.....	1	do.....	35	35	1.70	59	58.50
Pasture.....	972	.....	.....	.....	.....	11,554	11.89
Pas.....	2.25	Bushels...	2	.88	3.00	6	2.67
Potatoes, common.....	87.5	do.....	11,537	131.85	.50	5,769	65.98
Wheat.....	1,976.5	do.....	30,315	15.34	.85	25,768	12.04
Miscellaneous.....	5	.....	.....	.....	.....	25	5.00
Total cropped acreage.....	20,905	Total and average.....	.....	.....	.....	313,826	15.00
Irrigated, not cropped:							
Orchard.....	134						
Young alfalfa.....	1,916.5						
Ground fall plowed.....	689.5						
Miscellaneous.....	158.5						
Less duplicated areas.....	1,577.5						
Grand total irrigated.....	22,226						

*Crop report, Shoshone project, Wyoming, year of 1914—Continued.*

Areas.	Acres.	Farms.	Per cent of project.
Total irrigable area farms reported.....	25,599.42	429	15.6
Total irrigated area farms reported.....	23,226	429	13.5
Under water-right applications.....	22,069	428	13.4
Under rental contracts.....	157	1	.1
Total cropped area farms reported.....	20,905	429	12.7

**PUBLIC NOTICE DATED MARCH 1, 1915.**

1. Under the terms of existing public notices and orders the operation and maintenance charges for the irrigation season of 1914 for the Shoshone project, Wyoming, became due December 1, 1914.

2. In pursuance of the provisions of the reclamation act of June 17, 1902 (32 Stat., 388), and acts amendatory thereof and supplemental thereto, and in particular the reclamation extension act of August 13, 1914 (38 Stat., 686), section 6 of which authorizes the Secretary of the Interior to fix the due date for operation and maintenance charges, notice is hereby given that the operation and maintenance charge for the said project, which under existing public notice became due December 1, 1914, is postponed to and shall become due on March 1, 1915, and all operation and maintenance charges hereafter made against lands under the said project shall become due on March 1 of each year thereafter until further notice.

3. Hereafter no operation and maintenance charge shall be collected at the time water-right application is filed, but the first payment on account of operation and maintenance shall become due on March 1 of the year following the calendar year in which same was made: *Provided, however,* That if original homestead entry or original water-right application be filed after June 15 in any year the first payment on account of operation and maintenance will not become due until March 1 of the second calendar year following the date of entry.

4. For the operation and maintenance charge due March 1, 1915, no discount will be allowed for payment prior to such date, but penalties as prescribed by the extension act will attach. As to the operation and maintenance charges due March 1, 1916, and thereafter, the discount for payment made on or before the due date and the penalties for failure to make payment before the first day of the third calendar month after the due date will be applied as provided in section 6 of the said reclamation extension act. The penalties herein provided for attach and will be collected for all lands, whether acceptances of the extension act have been filed or not.

5. The operation and maintenance charges for the irrigation season of 1915 shall be due March 1, 1916, and each acre of irrigable land, whether irrigated or not, shall be charged with a minimum operation and maintenance charge of 50 cents, which will permit delivery of not more than 1 acre-foot per acre. Should further quantities be needed they will be furnished at the rate of 50 cents per acre-foot.

6. The provisions of this public notice shall apply to all lands subject to public notice heretofore issued for the said project.

7. Except as hereinabove provided all the terms and provisions of existing public notices and orders for the said project shall remain unchanged.

A. A. JONES,  
*First Assistant Secretary.*

### FINANCIAL STATEMENTS.

*Assets, liabilities, reserves, and capital, Shoshone project, to June 30, 1915.*

#### ASSETS.

##### Accounts receivable:

Construction charges due and uncollected from water-right applicants.....	\$4, 614. 47
Construction charges unaccrued on contracts with water-right applicants.....	1, 274, 449. 22
Operation and maintenance charges due and uncollected from water-right applicants.....	10, 569. 71
Uncollected freight refunds.....	5, 502. 79
Uncollected miscellaneous items.....	4, 111. 06

Total..... \$1, 299, 247. 25

##### Inventories:

Mercantile stores stock on hand.....	\$561. 96
Animals.....	2, 410. 05
Mechanical and other equipment.....	25, 151. 09
Material and supplies on hand in storehouses.....	53, 576. 70

Total..... 81, 699. 80

##### Construction work in process:

Gross expenditures for construction on project to date..... \$4, 325, 752. 93

##### Less revenues earned during construction as follows:

Rental of cottages.....	\$9, 702. 01
Rental of grazing land.....	752. 00
Rental of tents.....	755. 28
Rental of telephones.....	128. 90
Contractors' freight refunds.....	19, 355. 59
Forfeitures by defaulting bidders and contractors.....	45, 684. 76
Receipts from sale of town sites.....	38, 768. 97
Miscellaneous revenues.....	875. 17
Loss on mess houses.....	<sup>1</sup> 10, 166. 25
Profits on mercantile stores.....	3, 186. 38
Profits on ice.....	47. 80
Profits on hospitals.....	1, 244. 12

Total deductions..... 110, 334. 73

Net expenditures for construction of project to date..... 4, 215, 418. 20

Deferred operation and maintenance charges..... 75, 574. 79

Total assets..... 5, 671, 940. 04

#### LIABILITIES, RESERVES, AND CAPITAL.

##### Accounts payable:

Unpaid progress earnings under construction contracts.....	\$9, 493. 40
Unpaid labor.....	3, 236. 60
Unpaid purchases.....	2, 564. 68
Unpaid freight and express charges.....	14, 855. 62
Unpaid passenger fares.....	241. 32
Unpaid agreements to purchase real estate.....	24, 566. 95
Unpaid miscellaneous.....	10, 008. 15

Total..... 64, 966. 72

<sup>1</sup> Deduct.

Reserves for repayment to reclamation fund of cost of project:

Value of construction contracts with water-right applicants.....	\$1, 401, 925. 71	
Value of contracts with water-right applicants temporarily suspended.....	112, 664. 94	
Construction charges paid in advance by water-right applicants.....	1, 254. 35	
Construction charges paid and forfeited by water-right applicants.....	2, 580. 43	
Penalties paid by water-right applicants on overdue construction charges.....	100. 88	
<b>Total.....</b>		<b>\$1, 518, 506. 31</b>
<b>Net investment:</b>		
Disbursements.....	\$4, 490, 853. 72	
Transfers received from other projects.....	161, 246. 97	
		<b>\$4, 652, 100. 69</b>
<b>Less—</b>		
Collections.....	512, 011. 04	
Transfers issued to other projects.....	51, 622. 64	
		<b>563, 633. 68</b>
<b>Total.....</b>		<b>4, 088, 467. 01</b>
<b>Total liabilities, reserves, and capital investment of the Government.....</b>		
		<b>5, 671, 940. 04</b>

*Functional feature costs of Shoshone project to June 30, 1915.*

Examination and surveys.....	\$66, 263. 69
Storage system.....	1, 338, 145. 18
Canal system.....	2, 055, 009. 40
Lateral system.....	316, 002. 60
Drainage system.....	363, 496. 03
Farm units.....	9, 758. 33
Permanent improvements and land.....	171, 209. 91
Telephone system.....	4, 701. 39
Accrued and unpaid operation and maintenance charges and penalties transferred to and compounded with construction charges.....	147. 75
Stores and other operations.....	1, 018. 65
<b>Gross expenditures for construction of project to date.....</b>	<b>4, 325, 752. 93</b>

*Operating revenues and expenses of Shoshone project to June 30, 1915.*

**EXPENSES.**

<b>Storage system:</b>	
Operation.....	\$10, 841. 06
Maintenance.....	9, 638. 69
<b>Canal system:</b>	
Operation.....	21, 768. 09
Maintenance.....	18, 104. 31
<b>Lateral system:</b>	
Operation.....	40, 800. 09
Maintenance.....	30, 162. 55
<b>Drainage and flood protection:</b>	
Operation.....	1, 612. 23
Maintenance.....	4, 542. 95
<b>Undistributed expenses:</b>	
Maintenance.....	\$6, 014. 37
Miscellaneous supplemental construction to Aug. 31, 1914	41, 061. 70
Miscellaneous supplemental construction since Sept. 1, 1914	7, 027. 14
	<b>54, 103. 21</b>
<b>Accrued and unpaid operation and maintenance charges added to construction.....</b>	
	<b>147. 75</b>
<b>Total.....</b>	<b>191, 425. 43</b>

<sup>1</sup> Deduct.



## REVENUES.

Operation and maintenance charges accrued on contracts with water-right applicants.....	\$113,687.83
Operation and maintenance charges paid in advance by water-right applicants.....	156.98
Operation and maintenance charges paid and forfeited by water-right applicants.....	1,578.16
Rentals of irrigating water.....	427.67
Deferred operation and maintenance revenues (carried to debit side of assets and liabilities statement).....	75,574.79
Total.....	<u>191,425.43</u>

*Estimated cost of contemplated work on Shoshone project during fiscal year 1916.*

Examination and surveys—Examination and surveys on Government town sites as becomes necessary.....	\$3,000.00
Storage system—Lower outlet tunnel, balanced valves.....	1,500.00
Canal system:	
Frannie, preliminary and general work.....	\$2,500.00
Frannie, main canal.....	15,614.00
Total.....	<u>18,114.00</u>
Lateral system:	
Frannie division, laterals.....	\$213,072.00
Garland division, miscellaneous supplemental construction.....	5,000.00
Total.....	<u>218,072.00</u>
Drainage system.....	110,910.00
Farm units—Farm-unit subdivision.....	1,000.00
Permanent improvements and land:	
Buildings.....	\$1,710.00
Roads.....	894.00
Real estate.....	25,000.00
Total.....	<u>27,604.00</u>
Telephone system—Frannie division.....	500.00
Operation and maintenance under public notice.....	30,000.00
Stores and other operations (reimbursable accounts).....	8,600.00
Total.....	<u>419,300.00</u>

## **COLORADO RIVER BASIN PROJECTS.**

JOHN F. RICHARDSON, engineer, Green River, Wyo.

### **IRRIGATION PLAN.**

The Colorado River Basin projects consist of a number of possible irrigation developments on the lower Colorado River in Arizona and California. The irrigation plan of these projects provides in general for the diversion of water from Colorado River for irrigation of land near the river. The low water flow of Colorado River, after complete utilization by projects in the seven States interested in the water supply and claiming water rights, will be insufficient to irrigate all proposed developments. Their success will accordingly depend on, first, a satisfactory adjustment looking to an equitable division of the water supply and, second, the storage of flood waters which now run to waste in the drainage areas of the Grand and Green River systems, forming the Colorado River, and releasing this water at seasonable times to increase the amount available for irrigation use.

### **INVESTIGATIONS.**

In 1903 topographic surveys were made of the lands along the Colorado River from the Mexican border to about 100 miles north of Needles. Beginning in 1904 and continuing intermittently to the present time, preliminary examinations and surveys of reservoir sites on the Grand and Green River systems have been made as follows: The Kremmling, Windy Gap, and Lehman, on the Grand River; the Grand Lake at the head of the North Fork of Grand River; the Brown's Park on Green River; and two sites on Yampa, a tributary of Green River. Diamond drill and wash borings were made at the Kremmling site in 1905, and were begun at the dam site for Brown's Park Reservoir in the summer of 1907 and continued through the seasons of 1908 and 1909.

At the end of the fiscal year ending June 30, 1914, investigations were actively resumed, and during the fiscal year ending June 30, 1915, reconnaissance has been made of practically the entire watershed and examinations and surveys have been made as follows: The Junction reservoir on the Grand and Green Rivers in Utah; the Flaming Gorge Reservoir on the Green River in Utah and Wyoming; the Juniper reservoir on the Yampa River in Colorado; the Paradox Valley and Dolores reservoirs on the Dolores River in Colorado; the Bluff reservoir on the San Juan River in Utah. Diamond drilling and wash boring has been done at the Junction, Horseshoe Canyon, and Juniper Dam sites.

On June 1, 1915, a cooperative agreement was entered into with the State of Wyoming, providing for examination of irrigable lands on the Green River watershed in that State. Negotiations were con-

ducted with the governor of Colorado, with a view of securing a similar agreement with Colorado. The advice and assistance of the State engineer of Colorado have been promised toward this work.

**FINANCIAL STATEMENT.**

The assets and liabilities are shown in the financial statement for the secondary projects. The costs are given in the functional feature cost report, which follows the above statement, and the net investment is given in Tables 11 and 12 in the appendix.

# APPENDIX.

## LEGISLATION.

### RECLAMATION ACT.

**An Act Appropriating the receipts from the sale and disposal of public lands in certain States and Territories to the construction of irrigation works for the reclamation of arid lands.**

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That all moneys received from the sale and disposal of public lands in Arizona, California, Colorado, Idaho, Kansas, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oklahoma, Oregon, South Dakota, Utah, Washington, and Wyoming, beginning with the fiscal year ending June 30, 1901, including the surplus of fees and commissions in excess of allowances to registers and receivers, and excepting the 5 per cent of the proceeds of the sales of public lands in the above States set aside by law for educational and other purposes, shall be, and the same are hereby, reserved, set aside, and appropriated as a special fund in the Treasury to be known as the "reclamation fund," to be used in the examination and survey for and the construction and maintenance of irrigation works for the storage, diversion, and development of waters for the reclamation of arid and semiarid lands in the said States and Territories, and for the payment of all other expenditures provided for in this act: *Provided*, That in case the receipts from the sale and disposal of public lands other than those realized from the sale and disposal of lands referred to in this section are insufficient to meet the requirements for the support of agricultural colleges in the several States and Territories, under the act of August 30, 1890, entitled "An act to apply a portion of the proceeds of the public lands to the more complete endowment and support of the colleges for the benefit of agricultural and the mechanic arts, established under the provisions of an act of Congress approved July 2, 1862," the deficiency, if any, in the sum necessary for the support of the said colleges shall be provided for from any moneys in the Treasury not otherwise appropriated.

SEC. 2. That the Secretary of the Interior is hereby authorized and directed to make examinations and surveys for, and to locate and construct, as herein provided, irrigation works for the storage, diversion, and development of waters, including artesian wells, and to report to Congress at the beginning of each regular session as to the results of such examinations and surveys, giving estimates of cost of all contemplated works, the quantity and location of the lands which can be irrigated therefrom, and all facts relative to the practicability of each irrigation project; also the cost of works in process of construction as well as of those which have been completed.

SEC. 3. That the Secretary of the Interior shall, before giving the public notice provided for in section 4 of this act, withdraw from public entry the lands required for any irrigation works contemplated under the provisions of this act, and shall restore to public entry any of the lands so withdrawn when, in his judgment, such lands are not required for the purposes of this act; and the Secretary of the Interior is hereby authorized, at or immediately prior to the time of beginning the surveys for any contemplated irrigation works, to withdraw from entry, except under the homestead laws, any public lands believed to be susceptible of irrigation from said works: *Provided*, That all lands entered and entries made under the homestead laws within areas so withdrawn during such withdrawal shall be subject to all the provisions, limitations, charges, terms, and conditions of this act; that said surveys shall be prosecuted diligently to completion, and upon the completion thereof, and of the necessary maps, plans, and estimates of cost, the Secretary of the Interior shall determine whether or not said project is practicable and advisable, and if determined to be impracticable or unadvisable he shall thereupon restore said lands to entry; that public lands which it is proposed to irrigate by means of any contemplated works shall be subject to entry only under the provisions of the homestead laws in tracts of not less than 40 nor more than 160 acres, and shall be subject to the limitations, charges, terms, and conditions herein provided: *Provided*, That the commutation provisions of the homestead laws shall not apply to entires made under this act.

SEC. 4. That upon the determination by the Secretary of the Interior that any irrigation project is practicable, he may cause to be let contracts for the construction of the same, in such portions or sections as it may be practicable to construct and complete as parts of the whole project, providing the necessary funds for such portions or sections are available in the reclamation fund, and thereupon he shall give public notice of the lands irrigable under such project, and limit of area per entry, which limit shall represent the acreage which, in the opinion of the Secretary, may be reasonably required for the support of a family upon the lands in question; also of the charges which shall be made per acre upon the said entries, and upon lands in private ownership which may be irrigated by the waters of the said irrigation project, and the number of annual installments, not exceeding 10, in which such charges shall be paid and the time when such payments shall commence. The said charges shall be determined with a view of returning to the reclamation fund the estimated cost of construction of the project, and shall be apportioned equitably: *Provided*, That in all construction work eight hours shall constitute a day's work, and no Mongolian labor shall be employed thereon.

SEC. 5. That the entryman upon lands to be irrigated by such works shall, in addition to compliance with the homestead laws, reclaim at least one-half of the total irrigable area of his entry for agricultural purposes, and before receiving patent for the lands covered by his entry shall pay to the Government the charges apportioned against such tract, as provided in section four. No right to the use of water for land in private ownership shall be sold for a tract exceeding 160 acres to any one landowner, and no such sale shall be made to any landowner unless he be an actual bona fide resident on

such land, or occupant thereof residing in the neighborhood of said land, and no such right shall permanently attach until all payments therefor are made. The annual installments shall be paid to the receiver of the local land office of the district in which the land is situated, and a failure to make any two payments when due shall render the entry subject to cancellation, with the forfeiture of all rights under this act, as well as of any moneys already paid thereon. All moneys received from the above sources shall be paid into the reclamation fund. Registers and receivers shall be allowed the usual commissions on all moneys paid for lands entered under this act.

SEC. 6. That the Secretary of the Interior is hereby authorized and directed to use the reclamation fund for the operation and maintenance of all reservoirs and irrigation works constructed under the provisions of this act: *Provided*, That when the payments required by this act are made for the major portion of the lands irrigated from the waters of any of the works herein provided for, then the management and operation of such irrigation works shall pass to the owners of the lands irrigated thereby, to be maintained at their expense under such form of organization and under such rules and regulations as may be acceptable to the Secretary of the Interior: *Provided*, That the title to and the management and operation of the reservoirs and the works necessary for their protection and operation shall remain in the Government until otherwise provided by Congress.

SEC. 7. That where in carrying out the provisions of this act it becomes necessary to acquire any rights or property, the Secretary of the Interior is hereby authorized to acquire the same for the United States by purchase or by condemnation under judicial process, and to pay from the reclamation fund the sums which may be needed for that purpose, and it shall be the duty of the Attorney General of the United States upon every application of the Secretary of the Interior, under this act, to cause proceedings to be commenced for condemnation within thirty days from the receipt of the application at the Department of Justice.

SEC. 8. That nothing in this act shall be construed as affecting or intended to affect or to in any way interfere with the laws of any State or Territory relating to the control, appropriation, use, or distribution of water used in irrigation, or any vested right acquired thereunder, and the Secretary of the Interior, in carrying out the provisions of this act, shall proceed in conformity with such laws, and nothing herein shall in any way affect any right of any State or of the Federal Government or of any landowner, appropriator, or user of water in, to, or from any interstate stream or the waters thereof: *Provided*, That the right to the use of water acquired under the provisions of this act shall be appurtenant to the land irrigated, and beneficial use shall be the basis, the measure, and the limit of the right.

SEC. 9.<sup>1</sup> That it is hereby declared to be the duty of the Secretary of the Interior in carrying out the provisions of this act, so far as the same may be practicable and subject to the existence of feasible irrigation projects, to expend the major portion of the funds arising from the sale of public lands within each State and Territory hereinbefore named for the benefit of arid and semiarid lands within the

<sup>1</sup> Sec. 9 of this act repealed by the act of June 25, 1910.

limits of such State or Territory: *Provided*, That the Secretary may temporarily use such portion of said funds for the benefit of arid or semiarid lands in any particular State or Territory hereinbefore named as he may deem advisable, but when so used the excess shall be restored to the fund as soon as practicable, to the end that ultimately, and in any event within each ten-year period after the passage of this act, the expenditures for the benefit of the said States and Territories shall be equalized according to the proportions and subject to the conditions as to practicability and feasibility aforesaid.

SEC. 10. That the Secretary of the Interior is hereby authorized to perform any and all acts and to make such rules and regulations as may be necessary and proper for the purpose of carrying the provisions of this act into full force and effect.

Approved, June 17, 1902 (32 Stat., 388).

#### EXTENDING PERIOD OF PAYMENT.

**An Act Extending the period of payment under reclamation projects, and for other purposes.**

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled*, That any person whose lands hereafter become subject to the terms and conditions of the act approved June seventeenth, nineteen hundred and two, entitled "An act appropriating the receipts from the sale and disposal of public lands in certain States and Territories to the construction of irrigation works for the reclamation of arid lands," and acts amendatory thereof or supplementary thereto, hereafter to be referred to as the reclamation law, and any person who hereafter makes entry thereunder shall at the time of making water-right application or entry, as the case may be, pay into the reclamation fund five per centum of the construction charge fixed for his land as an initial installment, and shall pay the balance of said charge in fifteen annual installments, the first five of which shall each be five per centum of the construction charge, and the remainder shall each be seven per centum until the whole amount shall have been paid. The first of the annual installments shall become due and payable on December first of the fifth calendar year after the initial installment: *Provided*, That any water-right applicant or entryman may, if he so elects, pay the whole or any part of the construction charges owing by him within any shorter period: *Provided further*, That entry may be made whenever water is available, as announced by the Secretary of the Interior, and the initial payment be made when the charge per acre is established.

#### ACT SHALL APPLY TO EXISTING PROJECTS.

SEC. 2. That any person whose land or entry has heretofore become subject to the terms and conditions of the reclamation law shall pay the construction charge, or the portion of the construction charge remaining unpaid, in twenty annual installments, the first of which shall become due and payable on December first of the year in which the public notice affecting his land is issued under this act, and subsequent installments on December first of each year thereafter. The first four of such installments shall each be two per centum, the next

two installments shall each be four per centum, and the next fourteen each six per centum of the total construction charge, or the portion of the construction charge unpaid at the beginning of such installments.

#### PENALTIES.

SEC. 3. That if any water-right applicant or entryman shall fail to pay any installment of his construction charges when due, there shall be added to the amount unpaid a penalty of one per centum thereof, and there shall be added a like penalty of one per centum of the amount unpaid on the first day of each month thereafter so long as such default shall continue. If any such applicant or entryman shall be one year in default in the payment of any installment of the construction charges and penalties, or any part thereof, his water-right application, and if he be a homestead entryman his entry also, shall be subject to cancellation, and all payments made by him forfeited to the reclamation fund, but no homestead entry shall be subject to contest because of such default: *Provided*, That if the Secretary of the Interior shall so elect, he may cause suit or action to be brought for the recovery of the amount in default and penalties; but if suit or action be brought, the right to declare a cancellation and forfeiture shall be suspended pending such suit or action.

#### INCREASE OF CHARGES.

SEC. 4. That no increase in the construction charges shall hereafter be made, after the same have been fixed by public notice, except by agreement between the Secretary of the Interior and a majority of the water-right applicants and entrymen to be affected by such increase, whereupon all water-right applicants and entrymen in the area proposed to be affected by the increased charge shall become subject thereto. Such increased charge shall be added to the construction charge and payment thereof distributed over the remaining unpaid installments of construction charges: *Provided*, That the Secretary of the Interior, in his discretion, may agree that such increased construction charge shall be paid in additional annual installments, each of which shall be at least equal to the amount of the largest installment as fixed for the project by the public notice theretofore issued. And such additional installments of the increased construction charge, as so agreed upon, shall become due and payable on December first of each year subsequent to the year when the final installment of the construction charge under such public notice is due and payable: *Provided further*, That all such increased construction charges shall be subject to the same conditions, penalties, and suit or action as provided in section three of this act.

#### OPERATION AND MAINTENANCE.

SEC. 5. That in addition to the construction charge, every water-right applicant, entryman, or landowner under or upon a reclamation project shall also pay, whenever water service is available for the irrigation of his land, an operation and maintenance charge based upon the total cost of operation and maintenance of the project,



or each separate unit thereof, and such charge shall be made for each acre-foot of water delivered; but each acre of irrigable land, whether irrigated or not, shall be charged with a minimum operation and maintenance charge based upon the charge for delivery of not less than one acre-foot of water: *Provided*, That, whenever any legally organized water users' association or irrigation district shall so request, the Secretary of the Interior is hereby authorized, in his discretion, to transfer to such water users' association or irrigation district the care, operation, and maintenance of all or any part of the project works, subject to such rules and regulations as he may prescribe. If the total amount of operation and maintenance charges and penalties collected for any one irrigation season on any project shall exceed the cost of operation and maintenance of the project during that irrigation season, the balance shall be applied to a reduction of the charge on the project for the next irrigation season, and any deficit incurred may likewise be added to the charge for the next irrigation season.

#### PENALTIES.

SEC. 6. That all operation and maintenance charges shall become due and payable on the date fixed for each project by the Secretary of the Interior, and if such charge is paid on or before the date when due there shall be a discount of five per centum of such charge; but if such charge is unpaid on the first day of the third calendar month thereafter, a penalty of one per centum of the amount unpaid shall be added thereto, and thereafter an additional penalty of one per centum of the amount unpaid shall be added on the first day of each calendar month if such charge and penalties shall remain unpaid, and no water shall be delivered to the lands of any water-right applicant or entryman who shall be in arrears for more than one calendar year for the payment of any charge for operation and maintenance, or any annual construction charge and penalties. If any water-right applicant or entryman shall be one year in arrears in the payment of any charge for operation and maintenance and penalties, or any part thereof, his water-right application, and if he be a homestead entryman his entry also, shall be subject to cancellation, and all payments made by him forfeited to the reclamation fund, but no homestead entry shall be subject to contest because of such arrears. In the discretion of the Secretary of the Interior suit or action may be brought for the amounts in default and penalties in like manner as provided in section three of this act.

#### FISCAL AGENT.

SEC. 7. That the Secretary of the Interior is hereby authorized, in his discretion, to designate and appoint, under such rules and regulations as he may prescribe, the legally organized water users' association or irrigation district, under any reclamation project, as the fiscal agent of the United States to collect the annual payments on the construction charge of the project and the annual charges for operation and maintenance and all penalties: *Provided*, That no water-right applicant or entryman shall be entitled to credit for any payment thus made until the same shall have been paid over to an officer designated by the Secretary of the Interior to receive the same.

## RECLAMATION REQUIREMENTS.

SEC. 8. That the Secretary of the Interior is hereby authorized to make general rules and regulations governing the use of water in the irrigation of the lands within any project, and may require the reclamation for agricultural purposes and the cultivation of one-fourth the irrigable area under each water-right application or entry within three full irrigation seasons after the filing of water-right application or entry, and the reclamation for agricultural purposes and the cultivation of one-half the irrigable area within five full irrigation seasons after the filing of the water-right application or entry, and shall provide for continued compliance with such requirements. Failure on the part of any water-right applicant or entryman to comply with such requirements shall render his application or entry subject to cancellation.

## LANDS NOT SUBJECT TO RECLAMATION ACT.

SEC. 9. That in all cases where application for water right for lands in private ownership or lands held under entries not subject to the reclamation law shall not be made within one year after the passage of this act, or within one year after notice issued in pursuance of section four of the reclamation act, in cases where such notice has not heretofore been issued, the construction charges for such land shall be increased five per centum each year until such application is made and an initial installment is paid.

## WITHDRAWN LANDS SUBJECT TO ENTRY.

SEC. 10. That the act of Congress approved February eighteenth, nineteen hundred and eleven, entitled "An act to amend section five of the act of Congress of June twenty-fifth, nineteen hundred and ten, entitled 'An act to authorize advances to the reclamation fund and for the issuance and disposal of certificates of indebtedness in reimbursement therefor, and for other purposes,'" be, and the same hereby is, amended so as to read as follows:

"SEC. 5. That no entry shall be hereafter made and no entryman shall be permitted to go upon lands reserved for irrigation purposes until the Secretary of the Interior shall have established the unit of acreage per entry and water is ready to be delivered for the land in such unit or some part thereof and such fact has been announced by the Secretary of the Interior: *Provided*, That where entries made prior to June twenty-fifth, nineteen hundred and ten, have been or may be relinquished, in whole or in part, the lands so relinquished shall be subject to settlement and entry under the reclamation law."

## WATER SERVICE.

SEC. 11. That whenever water is available and it is impracticable to apportion operation and maintenance charges as provided in section five of this act, the Secretary of the Interior may, prior to giving public notice of the construction charge per acre upon land under any project, furnish water to any entryman or private landowner thereunder until such notice is given, making a reasonable charge therefor,

and such charges shall be subject to the same penalties and to the provisions for cancellation and collection as herein provided for other operation and maintenance charges.

#### ADMISSION OF PRIVATE LANDOWNERS TO NEW PROJECTS.

SEC. 12. That before any contract is let or work begun for the construction of any reclamation project hereafter adopted the Secretary of the Interior shall require the owners of private lands thereunder to agree to dispose of all lands in excess of the area which he shall deem sufficient for the support of a family upon the land in question, upon such terms and at not to exceed such price as the Secretary of the Interior may designate; and if any landowner shall refuse to agree to the requirements fixed by the Secretary of the Interior, his land shall not be included within the project if adopted for construction.

#### DISPOSITION OF EXCESS FARM UNITS.

SEC. 13. That all entries under reclamation projects containing more than one farm unit shall be reduced in area and conformed to a single farm unit within two years after making proof of residence, improvement, and cultivation, or within two years after the issuance of a farm-unit plat for the project, if the same issues subsequent to the making of such proof: *Provided*, That such proof is made within four years from the date as announced by the Secretary of the Interior that water is available for delivery for the land. Any entryman failing within the period herein provided to dispose of the excess of his entry above one farm unit, in the manner provided by law, and to conform his entry to a single farm unit shall render his entry subject to cancellation as to the excess above one farm unit: *Provided*, That upon compliance with the provisions of law such entryman shall be entitled to receive a patent for that part of his entry which conforms to one farm unit as established for the project: *Provided further*, That no person shall hold by assignment more than one farm unit prior to final payment of all charges for all the land held by him subject to the reclamation law, except operation and maintenance charges not then due.

#### ACCEPTANCE OF THIS ACT.

SEC. 14. That any person whose land or entry has heretofore become subject to the reclamation law, who desires to secure the benefits of the extension of the period of payments provided by this act, shall, within six months after the issuance of the first public notice hereunder affecting his land or entry, notify the Secretary of the Interior, in the manner to be prescribed by said Secretary, of his acceptance of all of the terms and conditions of this act, and thereafter his lands or entry shall be subject to all of the provisions of this act.

SEC. 15. That the Secretary of the Interior is hereby authorized to perform any and all acts and to make such rules and regulations as may be necessary and proper for the purpose of carrying the provisions of this act into full force and effect.

SEC. 16. That from and after July first, nineteen hundred and fifteen, expenditures shall not be made for carrying out the pur-

poses of the reclamation law except out of appropriations made annually by Congress therefor, and the Secretary of the Interior shall, for the fiscal year nineteen hundred and sixteen, and annually thereafter, in the regular Book of Estimates, submit to Congress estimates of the amount of money necessary to be expended for carrying out any or all of the purposes authorized by the reclamation law, including the extension and completion of existing projects and units thereof and the construction of new projects. The annual appropriations made hereunder by Congress for such purposes shall be paid out of the reclamation fund provided for by the reclamation law.

Approved, August 13, 1914 (38 Stat., 686).

#### RELINQUISHMENT OF HOMESTEAD ENTRIES.

**An Act For the relief of homestead entrymen under the reclamation projects of the United States.**

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That any person who has made homestead entry under the act of June seventeenth, nineteen hundred and two (Thirty-second Statutes at Large, page three hundred and eighty-eight), for land believed to be susceptible of irrigation which at the time of said entry was withdrawn for any contemplated irrigation project, may relinquish the same, provided that it has since been determined that the land embraced in such entry or all thereof in excess of twenty acres is not or will not be irrigable under the project, and in lieu thereof may select and make entry for any farm unit included within such irrigation project as finally established, notwithstanding the provisions of section five of the act of June twenty-fifth, nineteen hundred and ten, entitled "An act to authorize advances to the reclamation fund," and so forth, and acts amendatory thereof: *Provided,* That such entrymen shall be given credit on the new entry for the time of bona fide residence maintained on the original entry.

Approved, March 4, 1915 (38 Stat., 1215).

#### APPROPRIATION FOR UNITED STATES RECLAMATION SERVICE FISCAL YEAR 1916.

##### RECLAMATION SERVICE.

The following sums are appropriated out of the special fund in the Treasury of the United States created by the act of June seventeenth, nineteen hundred and two (Thirty-second Statutes, page three hundred and eighty-eight), and therein designated "the reclamation fund":

For all expenditures authorized by the act of June seventeenth, nineteen hundred and two (Thirty-second Statutes, page three hundred and eighty-eight), and acts amendatory thereof and supplementary thereto, known as the reclamation law, and all other acts under which expenditures from said fund are authorized, including salaries in the city of Washington and elsewhere; rent of office quarters in the city of Washington, \$8,040, and for rent elsewhere; exam-

ination of estimates for appropriations in the field; printing and binding; law books, books of reference, periodicals, engineering and statistical publications, not exceeding \$600; purchase, maintenance, and operation of horse-drawn or motor-propelled passenger-carrying vehicles; per diem in lieu of subsistence, when allowed, pursuant to section thirteen of the sundry civil appropriation act approved August first, nineteen hundred and fourteen; payment of damages caused to the owners of lands or private property of any kind by reason of the operations of the United States, its officers or employees, in the survey, construction, operation, or maintenance of irrigation works, and which may be compromised by agreement between the claimant and the Secretary of the Interior; and compensation to artisans and laborers for injuries under the act of May thirtieth, nineteen hundred and eight (Thirty-fifth Statutes, page five hundred and fifty-six), namely:

Salt River project, Arizona: For maintenance, operation, continuation of construction, and incidental operations, \$590,000;

Yuma project, Arizona-California: For maintenance, operation, continuation of construction, and incidental operations, \$825,000;

Orland project, California: For maintenance, operation, continuation of construction, and incidental operations, \$87,000;

Grand Valley project, Colorado: For maintenance, operation, continuation of construction, and incidental operations, \$702,000;

Uncompahgre project, Colorado: For maintenance, operation, continuation of construction, and incidental operations, \$469,000;

Boise project, Idaho: For maintenance, operation, continuation of construction, and incidental operations, \$1,650,000;

Minidoka project, Idaho: For maintenance, operation, continuation of construction, and incidental operations, \$410,000;

Jackson Lake enlargement work, Idaho-Wyoming: For maintenance, operation, continuation of construction, and incidental operations, conditioned upon the deposit of this amount by the Kuhn Irrigation and Canal Company and the Twin Falls Canal Company to the credit of the reclamation fund, \$476,000;

Garden City project, Kansas: For maintenance, operation, continuation of construction, and incidental operations, \$2,000;

Huntley project, Montana: For maintenance, operation, continuation of construction, and incidental operations, \$150,000;

Milk River project, Montana: For maintenance, operation, continuation of construction, and incidental operations, \$1,100,000;

Sun River project, Montana: For maintenance, operation, continuation of construction, and incidental operations, \$1,100,000;

Lower Yellowstone project, Montana-North Dakota: For maintenance, operation, continuation of construction, and incidental operations, \$70,000;

North Platte project, Nebraska-Wyoming: For maintenance, operation, continuation of construction, and incidental operations (including \$800,000 for the Fort Laramie unit), \$1,140,000;

Truckee-Carson project, Nevada: For maintenance, operation, continuation of construction, and incidental operations, \$236,000;

Carlsbad project, New Mexico: For maintenance, operation, continuation of construction, and incidental operations, \$128,000;

Hondo project, New Mexico: For maintenance, operation, continuation of construction, and incidental operations, \$6,000;

Rio Grande project, New Mexico-Texas: For maintenance, operation, continuation of construction, and incidental operations \$1,265,000;

North Dakota pumping project, North Dakota: For maintenance, operation, continuation of construction, and incidental operations, \$25,000;

Lawton project, Oklahoma: For maintenance, operation, continuation of construction, and incidental operations, \$50,000;

Umatilla project, Oregon: For maintenance, operation, continuation of construction, and incidental operations, \$366,000;

Klamath project, Oregon-California: For maintenance, operation, continuation of construction, and incidental operations, \$317,000;

Belle Fourche project, South Dakota: For maintenance, operation, continuation of construction, and incidental operations, \$144,000;

Strawberry Valley project, Utah: For maintenance, operation, continuation of construction, and incidental operations, \$393,000;

Okanogan project, Washington: For maintenance, operation, continuation of construction, and incidental operations, \$51,000;

Yakima project, Washington: For maintenance, operation, continuation of construction, and incidental operations, \$1,250,000;

Shoshone project, Wyoming: For maintenance, operation, continuation of construction, and incidental operations, \$478,000;

Secondary projects: For surveys and investigations of secondary projects, \$50,000;

In all, for the Reclamation Service, \$13,530,000.

Under the provisions of this act no greater sum shall be expended, nor shall the United States be obligated to expend, during the fiscal year nineteen hundred and sixteen, on any reclamation project appropriated for herein an amount in excess of the sum herein appropriated therefor, nor shall the whole expenditures or obligations incurred for all of such projects for the fiscal year nineteen hundred and sixteen exceed the whole amount in the "reclamation fund" for that fiscal year.

Ten per centum of the foregoing amounts shall be available interchangeably for expenditure on the reclamation projects named; but not more than ten per centum shall be added to the amount appropriated for any one of said projects.

No work shall be undertaken or expenditure made for any lands, for which the construction charge has been fixed by public notice, which work or expenditure shall, in the opinion of the Secretary of the Interior, increase the construction cost above the construction charge so fixed; unless and until valid and binding agreement to repay the cost thereof shall have been entered into between the Secretary of the Interior and the water right applicants and entrymen affected by such increased cost, as provided by section four of the act of August thirteenth, nineteen hundred and fourteen, entitled "An act extending the period of payment under reclamation projects, and for other purposes."

(38 Stat., 859).

**COUNTRY PARKS AND COMMUNITY CENTERS.**

**An Act To authorize the reservation of public lands for country parks and community centers within reclamation projects, and for other purposes.**

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the Secretary of the Interior be, and he is hereby, authorized to withdraw from other disposition and reserve for country parks, public playgrounds, and community centers for the use of the residents upon the lands such tracts as he may deem advisable not exceeding twenty acres in any one township in each reclamation project or the several units of such reclamation projects undertaken under the act of June seventeenth, nineteen hundred and two, known as the reclamation act.

SEC. 2. That subject to the provisions hereinafter contained every such tract of land so set apart shall be supplied with water from the Government irrigation system, the cost thereof to be charged to the remaining lands of the project as a part of the construction charge of such project, and shall be maintained and used in perpetuity by the people upon said reclaimed lands for a pleasure park, public playground, and community center.

SEC. 3. That for the purpose of carrying out and effecting the objects of this act the Secretary of the Interior is authorized to enter into a contract with the organization formed by the owners of the lands irrigated within said project or project unit pursuant to section six of the act of June seventeenth, nineteen hundred and two, stipulating and providing that the organization will maintain and use such of the lands so reserved for the purposes prescribed in this act as such organization may desire, and that upon failure to so maintain and use such lands, or in the event that same shall be permitted to be used or occupied for other purposes than those stipulated in this act, the control of the lands shall revert to the United States.

SEC. 4. That any of such lands not contracted for in accordance with the provisions of section three of this act within ten years from the time water is available for the same, or sooner, if the Secretary of the Interior may deem it desirable, shall be disposed of in accordance with the public-land laws applicable thereto, and the proceeds from the disposition of lands reverting to the United States under the provisions of this act, and from sales of water rights, shall be covered into the reclamation fund and placed to the credit of the project wherein the lands are situate.

Approved, October 5, 1914 (38 Stat., 727).

**DECISIONS OF THE SECRETARY OF THE INTERIOR.**

Below is given under suitable headings a digest of important decisions which have been rendered by the Secretary of the Interior during the fiscal year relative to operations under the reclamation law. A few decisions by the Comptroller of the Treasury and an opinion by the Attorney General are also included.

**APPROPRIATIONS, CONGRESSIONAL.**

Work done under contracts before the date when expenditures from the reclamation fund are prohibited without annual appropriation

may be paid from said fund thereafter, if the physical act of payment alone remains to be done, but work done after the prohibited date may not be paid from said fund. (21 Comp., 313.)

#### **CONTRACTS.**

Under sections 2 and 4 of the reclamation act the Secretary of the Interior has general authority to contract, even in cases where under the general statutes contract is prohibited prior to the passage of an appropriation available therefor. The effect of section 16 of the act of August 13, 1914, is merely to prohibit the payments upon contracts previously made for work done after June 30, 1915, in the absence of further appropriation. Contracts duly made under the conditions preceding the necessity for annual appropriations will not be considered as terminating June 30, 1915, if appropriations become available for work thereunder after June 30, 1915. (21 Comp., 447.)

#### **EIGHT-HOUR LAW.**

The eight-hour law of June 19, 1912 (37 Stat., 137), which provides for a penalty of \$5 per day for each laborer working in excess of eight hours upon construction contracts or materials under special specifications, the same to be deducted from the monthly estimates of the contractor, is effective in regard to work of the Reclamation Service since the service was put upon an annual appropriation basis by the act of August 13, 1914. (38 Stat., 686.) Prior to that time the act did not apply to the work of the Reclamation Service. (Comptroller of the Treasury June 8, 1915.)

#### **LIMIT OF LAND HOLDINGS.**

A person who holds a farm unit shall not be permitted before full payment has been made on the appurtenant water right to acquire other lands with appurtenant water rights unless the water-right charges on the latter have been fully paid; similarly a person may hold private lands with appurtenant water rights up to the limit of single ownership fixed for a project in one or more parcels before full payment of the water-right charge, but may not acquire other lands with appurtenant water rights unless the water-right charges thereon have been paid in full. (Instructions approved July 22, 1914; 43 L. D., 339-341.)

#### **LIQUIDATION OF DAMAGES BY EXECUTIVE OFFICERS.**

By decision of September 9, 1914, the Comptroller of the Treasury held that the accounting officers were authorized to settle claims upon an agreement of the claimant and the proper officer of the Government as a liquidation of what might be otherwise an unliquidated claim for value, thus reversing former decisions. (21 Comp., 134.)

By decision of June 15, 1915, not printed, the Comptroller of the Treasury decided that where damage to lands arises in connection with construction, operation, or maintenance of a project, and is caused neither by negligence nor by accident, the Secretary of the Interior now and always has had under section 10 of the reclamation



act the power to liquidate the damages, as declared by Congress in the appropriation act of March 3, 1915. (38 Stat., 351.) The comptroller holds that this is a legislative construction of the reclamation act. The damages in question must be due to acts by direction of competent authority. (Shoshone project, Scott case, comptroller's decision June 15, 1915.)

#### **RECLAMATION HOMESTEAD—ISSUE OF PATENT BEFORE PUBLIC NOTICE.**

Where water has become available from any source for the irrigation of land in a reclamation homestead entry and final proof has been made, including proof of reclamation of one-half the irrigable area, and it is practicable to designate a farm unit covering the whole or a part of the area included in the entry, and the entryman makes water-right application subject to future public notices and charges fixed in the future by the Secretary, patent may issue under the provisions of the act of August 9, 1912 (37 Stat., 265), for an area conforming to such farm unit. This is in accordance with instructions issued by the Secretary of the Interior regarding the Boise project March 3, 1913, which provides for modifying paragraph 5 of the General Reclamation Circular as follows:

Where, prior to issuance of public notice, water has been furnished on a water-ental basis to reclamation entrymen or others and by means whereof reclamation sufficient to obtain patent or water-right certificate under the act of August 9, 1912, has been accomplished and satisfactory proof made, water-right applications may be received from such entrymen or others desiring to obtain patent or water-right certificate under that act upon the form of application approved by the department, modified so as to refer to the irrigable acreage and the charge per acre as thereafter announced by the Secretary. In such cases reclamation homestead entries must be conformed to farm units as established by the Secretary of the Interior. If not therefore created, farm units may be established upon application.

#### **RECLAMATION HOMESTEAD—MARRIED WOMEN; ASSIGNMENT UNDER ACT OF JUNE 23, 1910.**

A married woman otherwise qualified is competent to take an assignment of lands within a reclamation project under the act of June 23, 1910 (36 Stat., 592). The fact that her husband holds another farm unit upon which all charges have not been paid is not material. The cases of Robert C. Newlon (41 L. D., 421) and Noah A. Snook et al. (41 L. D., 428) overruled so far as in conflict. (Case of Sadie L. Hawley, 43 L. D., 364.)

#### **RELEASE ON CONTRACTS.**

When a contract requires a release to be executed by the contractor before final payment, the execution of said release with full knowledge of facts that might establish a claim against the Government estops the contractor from presenting any claim thereunder. (Worden-Allen Co., 21 Comp., 183.)

#### **RESIDENCE—RECLAMATION HOMESTEAD AND PRIVATE LAND—AFTER ASSIGNMENT OR TRANSFER.**

An assignee under the act of June 23, 1910 (36 Stat., 592), of a reclamation homestead is not required to reside upon the land or in the vicinity thereof as a condition prerequisite to obtaining patent and water right. (Instructions Apr. 2, 1914, 43 L. D., 456.)

The residence requirements provided for in section 5 of the reclamation extension act apply to all persons acquiring by assignment water-right contracts with the United States unless prior to such assignment final water-right certificate contemplated by section 1 of the act of August 9, 1912, has been issued, in which event the land may be freely alienated subject to the lien of the United States. Prior to the issue of such final water-right certificate the limit of residence which has been fixed at a maximum of 50 miles, will remain in effect. (Case of H. G. Colton; instructions Feb. 16, 1915; 43 L. D., 518.)

#### TIMBER ON NATIONAL FORESTS.

Under the act of February 8, 1905 (33 Stat., 706), the Reclamation Service may use timber from the national forests without charge in connection with work performed in cooperation with private parties under the provisions of the Warren Act of February 21, 1911 (36 Stat., 925.) (Attorney General to Secretary of Agriculture, July 3, 1905, in regard to Jackson Lake enlargement.)

#### WITHDRAWALS.

Where land is included in a first-form withdrawal after homestead or desert-land entry has been made, such entries should be allowed to proceed to final proof, certificate, and patent regardless of such withdrawal. Where, however, entries are erroneously allowed after withdrawal, the field office of the Reclamation Service shall be promptly advised upon submission of final proof, and no final certificate or patent shall issue until the case has been referred to the Washington office of the Reclamation Service for consideration and recommendation. (Case of Agnes C. Pieper, 35 L. D., 459, overruled; instructions of Aug. 26, 1914; 43 L. D., 374.)

#### LITIGATION.

[Cases initiated in fiscal year ending June 30, 1915, marked thus \*.]

#### ARIZONA, SALT RIVER PROJECT.

*Arizona Alfalfa Milling Co. v. United States.*—Suit in the Court of Claims for damages. Case still pending.

\* *United States v. Ada Lee Springer.*—Suit initiated December 19, 1914, to recover amount due upon her promissory note of \$1,923.10, due for water supply furnished under water-rental contract. April 10, 1915, judgment was rendered for \$2,182.85, with costs amounting to about \$20.

\* *Town of Mesa City.*—The town of Mesa on December 28, 1914, filed a petition in the case of *Hurley v. Abbott* for an order to enjoin the United States from refusing to deliver water, which refusal was based upon the failure of the town to enter into a contract for water rental. Case settled by contract dated May 1, 1915, providing an appropriate payment thereunder for water previously delivered. Suit dismissed June 12, 1915.

\* *W. B. Lount and Hattie L. Mosher v. A. J. Haltom.*—Proceedings against Assistant Engineer Haltom of the Reclamation Service because he removed from a canal of the United States certain piers

which had been erected therein by W. B. Lount and Hattie L. Mosher. He was found guilty, and an appeal was taken to the superior court for Maricopa County. Tried before justice of the peace May 12, 1915. Case still pending.

*W. B. Lount and Hattie L. Mosher v. A. J. Haltom.*—Case initiated May 25, 1915; a civil suit for damages on account of the removal of the piers involved in the criminal proceedings against Haltom, as above. June 26, 1915, case removed to the United States District Court for the District of Arizona. Case still pending.

#### ARIZONA-CALIFORNIA, YUMA PROJECT.

*United States v. D. L. De Vane and Althea Modesti.*—Condemnation of lands. Judgment rendered December 5, 1914. Motion for new trial overruled June 21, 1915.

#### COLORADO, GRAND VALLEY PROJECT.

*Adjudication water rights Grand River, District No. 42.*—Case pending before supreme court of Colorado on writ of error.

#### COLORADO, UNCOMPAHGRE VALLEY PROJECT.

*United States v. Alymer F. Reeves.*—Condemnation of lands. Case still pending.

*United States v. James O' Neill and Jesse O' Neill.*—Case dismissed September 9, 1914, settlement having been effected out of court.

*United States v. Martin Van Horn et al.*—Case still pending.

*United States to the use of the Montrose Hardware Co. et al. v. C. D. McPhee et al.*—July 6, 1914, opinion rendered holding that the United States was not entitled to recover against the sureties, but that the sureties, except J. B. Orman, were liable to the plaintiffs and intervenors who furnished labor and material to the contractor. Motions for new trial filed by the United States and by the defendants July 7, 1914, were overruled. The case is now in the supreme court of Colorado on writs of error.

*United States v. Linus E. Curtis et al.*—Condemnation of land. Case settled September 9, 1914, for \$125.

#### IDAHO, BOISE PROJECT.

*United States v. Marsters and Lakin.*—This case was tried on June 10 and 11, 1915, and judgment was awarded the United States for \$1,000 and costs. The defendants have taken an appeal to the circuit court of appeals.

*Farmers' Cooperative Ditch Co. v. Riverside Irrigation District et al.*—This case involves a determination of the duty of water on lands under the various canals diverting water from Boise River. It was tried in the State district court, Caldwell, Idaho, April 15 to May 1, 1915, but was not completed. June 4, 1915, application was made for a temporary order to govern the distribution of the water to Boise River during the season of 1915, and an order issued in practically the same terms as that for the year 1914. (See p. 349, Thirteenth Annual Report.)

*Pioneer Irrigation District v. American Ditch Co. et al.*—This case involved the adjudication of priority of water rights from Boise River

acquired since the "Stewart decree." Preliminary motions and demurrers were disposed of and the parties given until August 1, 1915, for filing cross complaint.

*United States v. American Ditch Co. et al.*—Trial of case postponed.

*United States v. Highland Valley Power Co.*—Stipulation for a settlement has been agreed upon and order of court has been issued for a receiver's sale of the property desired by the United States.

*United States v. Quirk.*—Condemnation of land; settled for \$4,500.

*Page and Brinton v. United States.*—Suit in Court of Claims for \$325,000. Case still pending.

*State Bank of Chicago v. Idaho-Oregon Light & Power Co.; United States, intervenor.*—This case was to recover a debt of the United States against the power company, which was in the hands of a receiver. Case closed by recovery of \$11,329.88 against the bank and the sum of \$4,877.12 from the bondholders' committee in charge of the reorganization of the company; total, \$16,207.

*George R. Glover v. Frank L. Brown, United States et al.*—Case to quiet title; still pending on motion of United States attorney to dismiss as to United States.

*\*In re petition Nampa-Meridian Irrigation District.*—This case was initiated February 8, 1915, for the purpose of confirming a proposed contract with the United States for construction of drainage works within the district and for the furnishing of stored water. The case was tried at Caldwell, Idaho, in the State court on May 10 and 11, 1915. Judgment was entered confirming the proceedings as prayed for in the petition.

*\*United States v. State of Idaho.*—Condemnation of State land in Canyon County. Case initiated August 26, 1914, and still pending.

*\*United States v. Idaho.*—Condemnation of State lands in Ada County. Case initiated August 26, 1914, and still pending.

*\*United States v. Western National Bank.*—Condemnation of land. Case initiated September 2, 1914. Case settled October 6, 1914, for \$840.

*\*United States v. A. K. Callaway.*—Condemnation of land. Amount involved, \$99. Case initiated September 2, 1914. Case settled September 21, 1914, for \$99.

*\*United States v. Jane Callaway.*—Condemnation of land. Case initiated September 2, 1914. Case settled September 18, 1914, for \$304.

*\*United States v. Snell and Isham.*—Condemnation of land. Case initiated September, 1914. Case settled September 30 for \$500.

*\*United States v. Mrs. Ada Roberts et al.*—Condemnation of land. Case initiated September 2, 1914. Case settled September 15, 1914, for \$316.

*\*United States v. Elijah Frost.*—Condemnation of land. Case initiated September 2, 1914; case settled September 15, 1914, for \$410.

#### IDAHO, MINIDOKA PROJECT.

*Brinck, Receiver, v. United States.*—This is a suit in the Court of Claims for \$122,148. Further proceedings were taken and the case is still pending.

*Minidoka & Southwestern Railroad Co. v. United States.*—November 30, 1914, the Supreme Court of the United States reversed the

decision of the Circuit Court of Appeals and affirmed that of the Circuit Court of the District of Idaho, holding that as to lands which had been withdrawn under the reclamation act, and which had been included in homestead entry duly made, the railroad company could acquire from the homesteader a right of way without securing consent of the Secretary of the Interior, but that proper provision must be made that the culverts and other crossings of the Government irrigation works be so built as not to interfere with the flow of water.

*United States v. Salt Lake & Idaho R. R. Co.*—Case dismissed February 8, 1915, on authority of *Minidoka & Southwestern R. R. Co. v. United States*.

\* *United States v. State of Idaho*.—Condemnation of State lands in Blaine County. Case initiated May 17, 1915. Case settled for \$268.

\* *United States v. State of Idaho*.—Condemnation of State lands in Power County. Case initiated May 12, 1915. Case settled for \$1,141.

\* *United States v. State of Idaho*.—Condemnation of State lands in Cassia County. Case initiated May 12, 1915. Case settled for \$1,200.

\* *United States v. B. D. Sheffield et al.*—Condemnation of land at the outlet of Jackson Lake. Case initiated June 20, 1914, in United States District Court of Wyoming. Order of court giving United States possession of property issued June 20, 1914. Case still pending.

#### KANSAS, GARDEN CITY PROJECT.

*Camden Iron Works v. United States*.—Suit in Court of Claims, No. 157. Case still pending. Set for hearing October 28, 1915.

*George H. Reeve v. Finney County Water Users' Association et al.*—On August 22, 1914, corrected order of the court was filed reciting the fact that the Attorney General of the United States, acting as a friend of the court, and in no other capacity, suggested that the court is without jurisdiction to hear the matter involved in the case, and that the United States could not be bound by any decision the court might render; and that no process had been served upon the Attorney General of the United States or upon the United States attorney for the district of Kansas, and also that the said suggestions had been overruled.

#### MONTANA, BLACKFEET (INDIAN) PROJECT.

*George W. Cook and David D. La Breche v. United States*.—Case pending before department on arbitration.

#### MONTANA, FLATHEAD (INDIAN) PROJECT.

*United States v. F. W. Keeler et al.*—Case still pending.

*John Rohrig v. Jesse Lee et al.*—Case settled by contract.

\* *United States v. Herman Knutson Romtvedt*.—In May, 1915, suit was filed by the United States in the district court for Montana to recover possession of 120 acres of land reserved for the Nine Pipe Reservoir. Defendant has filed demurrer.

**MONTANA, MILK RIVER PROJECT.**

\**United States v. Alonzo and B. S. Durell*.—Condemnation of land. Case initiated September 26, 1914; settled by contract May 8, 1915, for \$511.17.

**MONTANA, MILK RIVER PROJECT, ST. MARY STORAGE UNIT.**

*Henry Henkel et al v. United States*.—April 5, 1915, the Supreme Court of the United States decided that Henkel had no right or interest in the lands at the outlet of St. Mary Lake which were in controversy.

*George Henkel et al v. United States*.—This case for the possession of certain lands at the outlet of Lower St. Mary Lake is still pending in the United States District Court for Montana.

**MONTANA-NORTH DAKOTA, LOWER YELLOWSTONE PROJECT.**

*United States v. M. A. Hardy et al*.—Condemnation of land. Property appraised by commissioners. Case settled September 20, 1914, by payment of award of \$391.50

*United States v. Sylvia H. Lovering, Administratrix*.—Case closed March 15, 1915. Payment made as per contract, \$238.

*United States v. Pacific Coast Construction Co.*—Suit in Court of Claims; still pending.

**NEBRASKA-WYOMING, NORTH PLATTE PROJECT.**

*S. R. H. Robinson & Son Contracting Co. v. United States*.—Suit in Court of Claims still pending.

**NEVADA, TRUCKEE-CARSON PROJECT.**

*United States v. the Floriston Pulp & Paper Co.*—Title of case, *United States v. the Truckee River General Electric Co.* Condemnation proceedings for lands at outlet of Lake Tahoe. Decree entered upon stipulation June 4, 1915; amount, \$139,500. Payment made June 23, 1915, and possession turned over to United States July 1.

*United States v. Rickey Land & Cattle Co.*—Case suspended awaiting action by defendants.

*United States v. Orr Water & Ditch Co.*—Suit for the adjudication of water rights, Truckee River. Case still pending.

*John Horstman Co. v. United States*.—Suit in Court of Claims for damage to Soda Lake property. Case still pending.

*Natron Soda Co. v. United States*.—Suit in Court of Claims for damage to property in Little Soda Lake. Case still pending.

*Western Co. v. Stone & Webster Construction Co., Truckee River General Electric Co. et al.*—Case still pending.

**NEW MEXICO, CARLSBAD PROJECT.**

\**United States v. Charles A. Bigelow et al.*—Condemnation of land. Case initiated January 15, 1915, for additional flowage rights for McMillan Reservoir. There are 30 or more defendants and about 2,500 acres are involved.

**NEW MEXICO, HONDO PROJECT.**

*United States v. El Paso and Rock Island Railway Co.*—Adjudication of the waters of Hondo River. Case still pending.

**NEW MEXICO-TEXAS, RIO GRANDE PROJECT.**

*Oscar C. Snow v. Francisco Abalos et al.*—Suit for the adjudication of water rights of the Rio Grande in New Mexico. Case still pending.

*El Paso Water Users' Association v. W. H. Austin et al.*—Suit for the adjudication of water rights of the Rio Grande in Texas. Case still pending.

*United States v. Lauteria Birner et al.*—Condemnation of land, Elephant Butte Reservoir, Socorro County. Report of commissioners of appraisal confirmed June 30, 1915.

*United States v. Jose Antonio Anaya et al.*—Condemnation of land for Engle Reservoir, Sierra County. Report by commissioners of appraisal pending.

\**Elephant Butte Water Users' Association et al. v. L. M. Lawson et al.*—Suit filed in the district court for the third judicial district, N. Mex., May 4, 1915, praying for mandatory injunction requiring officials of the Reclamation Service to deliver, through Leasburg Dam and Canal, to certain community ditches and owners of rights thereunder, the normal flow of the Rio Grande to which the plaintiffs asserted a vested right, delivery of water having been discontinued on account of the refusal of the parties affected to execute water-rental contracts. A temporary restraining order was issued, but subsequently an agreement was reached and the case was dismissed at the cost of the plaintiffs.

**OREGON, UMATILLA PROJECT.**

*Determination of water rights, Umatilla project.*—Case still pending. Argument set for September 16, 1915.

**OREGON-CALIFORNIA, KLAMATH PROJECT.**

*Klamath Lake Navigation Co. v. California, Northeastern Railway Co. and Southern Pacific Co.*—Case still pending.

*Adjudication proceedings Lost River water rights before State Water board.*—Case still pending, United States appearing by suggestion.

*United States v. Robert A. Miller.*—Condemnation of land. Case settled by contract of December 1, 1914.

**SOUTH DAKOTA, BELLE FOURCHE PROJECT.**

*Widell-Finley Co. et al v. United States.*—No. 31436 Court of Claims. Damages on account of contract for construction of main supply canal. Case still pending.

*Belle Fourche Valley Water Users' Association v. Magruder et al.*—Suit in regard to various matters of controversy as to operation and maintenance, betterments, etc. Appeal from interlocutory orders decided by Circuit Court of Appeals, court sustaining the orders. Case now pending in United States District Court.

*Samuel H. R. Robinson v. United States.*—Court of Claims, No. 32678, for damages in connection with construction of main supply canal, Belle Fourche Project. Case still pending.

**WASHINGTON, OKANOGAN PROJECT.**

\* *United States v. Mineral Hill Ditch Co.*—Complaint filed in the District Court of the United States for Eastern District of Oregon April 18, 1915. This suit is brought on account of the diversion by the defendant corporation of a larger amount of water and during a longer period in the irrigation season than the United States is prepared to concede to the defendant under its prior appropriation. The action is in the nature of a suit to quiet title and seeking an injunction.

**WASHINGTON, YAKIMA PROJECT.**

*United States v. Theodore Weisberger and wife and the Empire State Surety Co.*—Appeal to the United States Supreme Court was perfected. On November 16, 1914, on motion of attorney for defendants appeal was dismissed by the Supreme Court (235 U. S., 713), the court having previously decided that a motion for a judgment, notwithstanding the verdict given, be granted upon the evidence under the Seventh Amendment of the Constitution of the United States (228 U. S., 387).

*Theodore Weisberger and wife v. United States.*—Suit filed in United States Court of Claims January 22, 1914, for damages in the sum of \$91,803.33 claimed as a result of suspension of claimant's contract for constructing and laying concrete shapes, Tieton Main Canal. Case pending.

*United States v. West Side Irrigating Company.*—Testimony taken March, 1915.

\* *United States v. Michael J. Sullivan.*—Condemnation for easement for pipe and telephone line, Sunnyside unit, filed in the District Court of the United States for Eastern District of Washington, July 1, 1914.

**WYOMING, JACKSON LAKE ENLARGEMENT.**

State engineer's rejection of application for enlargement of Jackson Lake Reservoir recalled and application approved June 11, 1914.

*United States v. B. D. Sheffield et al.*—See Idaho, Minidoka project.

**WYOMING, SHOSHONE PROJECT.**

*United States Fidelity & Guaranty Co. v. United States.*—Suit in Court of Claims for damages in connection with the construction of Shoshone Dam under contract. Case still pending.

**PUBLIC NOTICES AND ORDERS.**

During the fiscal year ending June 30, 1915, 24 formal public notices and orders were issued by the Secretary of the Interior in connection with the several reclamation projects. These notices and orders are printed under the appropriate project headings. In addition, the following public notices and orders relating to all projects were issued:

**PUBLIC NOTICE DATED SEPTEMBER 24, 1914.**

1. In pursuance of the provisions of the reclamation extension act of August 13, 1914 (Public No. 170), notice is hereby given that the



charges for a water right for lands under the several projects and units thereof for which public notice or notices have heretofore issued are of two kinds: (1) A charge per irrigable acre for the building of the irrigation system termed the construction charge; (2) an annual charge for each acre-foot of water delivered, payable at such time as may hereafter be fixed, for the operation and maintenance of the project or a unit thereof. Each acre of irrigable land, whether irrigated or not, will be charged with a minimum operation and maintenance charge based upon the charges for delivery of not less than one acre-foot of water.

2. The amount of the construction charge per irrigable acre for lands for which entry under the provisions of the reclamation act of June 17, 1902 (32 Stat., 388), or water-right application has heretofore been made, shall be the amount fixed in the several public notices heretofore issued for the respective lands and therein termed "the building charge," and will not be increased, except as provided in said reclamation extension act.

3. Any person whose lands or entry has heretofore become subject to the terms and conditions of the reclamation law may secure the benefits of the extension of the period of payments provided for in the said reclamation extension act by notifying the Secretary of the Interior of his acceptance of all the terms and conditions of said act. Such notice of acceptance shall be in the form prescribed by the Secretary and may be obtained from the project manager on application. Such acceptance must be filed with the project manager within six months from the date of this public notice. The construction charge, for the lands or entries of persons so accepting the benefits of the period of extension, or so much thereof as may remain unpaid at the time of filing said notice of acceptance, must be paid in not more than 20 annual installments, the first of which installments will be due December 1, 1914, and the subsequent installments due December 1 of each year thereafter. The first four of such annual installments shall be each 2 per centum, and the next two installments each 4 per centum, and the remaining 14 installments each 6 per centum of the said construction charge or of the portion thereof remaining unpaid at the time of filing said notice of acceptance, as the case may be. The whole or any part of the construction charge may be paid within any shorter period than 20 years if so desired.

4. The method of determining the annual operation and maintenance charge, the penalties for failure to pay the construction charges and the operation and maintenance charges when due, the reclamation requirements, and the discount allowed for prepayment of the operation and maintenance charges are prescribed by the said reclamation extension act.

FRANKLIN K. LANE,  
*Secretary of the Interior.*

[To be detached from public notice, acknowledged, recorded, and transmitted to project manager.]

ACCEPTANCE OF TERMS AND CONDITIONS OF RECLAMATION EXTENSION ACT.

(Approved Aug. 13, 1914.)

I, ..... { owner } of .....  
 ..... { entryman } of .....  
 ..... project, desiring to secure the benefits of the reclama-  
 tion extension act, approved August 13, 1914 (Public No. 170), and public notice  
 thereunder having been duly issued as provided by said act, do hereby accept the  
 terms and conditions of said act.

It is understood and agreed that this acceptance will operate to amend and reform  
 any water-right application made to the United States for above-described lands and  
 now in force and effect, to conform to the terms and conditions of said act in so far as  
 such terms and conditions may be applicable to such lands and to said application.

(Execution of this instrument must be acknowledged in all cases except reclamation  
 homestead entries.)

ACKNOWLEDGMENT.

State of ..... } ss.  
 County of ..... }

(Form to be that required by State law.)

My commission expires .....

.....,  
*Notary Public.*

**PUBLIC NOTICE DATED MARCH 20, 1915.**

1. Under the provisions of public notices and orders heretofore  
 issued fixing the operation and maintenance charges for the various  
 projects, such charges have in some cases accrued and accumulated  
 against the lands.

2. In order to provide for the collection of such charges and at the  
 same time avoid burdening the applicants by requiring advance pay-  
 ment thereof, it is hereby ordered that in case the operation and main-  
 tenance charges have thus accrued and remain as a charge against any  
 lands for which water-right application has not been filed, prepay-  
 ment thereof will not be required, but such accumulated charges shall  
 be added to and made a part of the construction charges upon which  
 the various installments to be paid under the terms of the reclama-  
 tion extension act shall be computed.

3. The provisions of this notice shall not affect any lands remain-  
 ing under the terms and provisions of the laws enacted prior to August  
 13, 1914.

A. A. JONES,  
*First Assistant Secretary.*

**ORDER DATED AUGUST 13, 1914.**

No action will be taken looking toward the cancellation of entries  
 or water-right applications on reclamation projects for delinquency  
 of payments of building or construction charges pending the prepara-  
 tion and issuance of public notices under the provisions of the recla-  
 mation extension act. All due accounts for operation and mainte-  
 nance charges are subject to orders previously issued.

FRANKLIN K. LANE.

**PURCHASES OF RIGHTS AND PROPERTY.**

The following purchases of rights and property were made during the fiscal year ending June 30, 1915:

*Purchases of rights and property.*

## ARIZONA, SALT RIVER PROJECT.

Vendor.	Description.	Consideration.	Date of deed.
Ayers, Arthur W., and Iva S. Ayers.	Improvements on tract in sec. 12, T. 1 S., R. 5 E.	\$6.30	Apr. 30, 1914
Chandler, H. L., and Bertha T.	Improvements on tract of land in sec. 10, T. 1 S., R. 5 E.	20.00	May 20, 1914
Chandler, H. L., and Bertha.	Improvements on strip of land in SW. $\frac{1}{4}$ sec. 10, T. 1 S., R. 5 E.	30.00	Dec. 18, 1914
Cox, H. N.	3 A. in NE. cor. sec. 17, T. 2 N., R. 1 E.	500.00	Dec. 23, 1913
Dobson, Wilson Wesley, and Emma.	1.51 A. in SW. $\frac{1}{4}$ NE. $\frac{1}{4}$ , sec. 7, T. 1 S., R. 5 E.	226.50	Dec. 7, 1914
Drane, John A., and Ella M.	Improvements on strip of land north side of public road between secs. 27 and 34, T. 1 N., R. 5 E.	30.00	July 31, 1914
Jones, T. R., and R. F.	Improvements on strip of land in NE. $\frac{1}{4}$ NW. $\frac{1}{4}$ , sec. 22, T. 1 S., R. 5 E.	10.00	Mar. 10, 1915
Kelly, Jesse F., and Jennie C., and Chandler, H. L., and Bertha T.	1.44 A. in sec. 7, T. 1 S., R. 6 E.	108.00	Dec. 15, 1914
Leininger, A. E., and Barbara A.	1.42 A. in NE. $\frac{1}{4}$ sec. 9, T. 1 S., R. 5 E.	227.20	Nov. 30, 1914
Miller, Mrs. Augusta.	Improvements on certain strip of land in SW. $\frac{1}{4}$ sec. 29, T. 1 N., R. 6 E.	32.40	Oct. 26, 1914
Morris, Hyram B., and Eliza S.	Improvements on strip of land SE. $\frac{1}{4}$ SE. $\frac{1}{4}$ sec. 27, T. 1 N., R. 5 E.	15.00	July 9, 1914
North, L. H., and Mary E.	Improvements on strip of land in sec. 19, T. 1 N., R. 6 E.	225.00	Oct. 31, 1914
Nowell, N. L.	Improvements on tract of land in sec. 7, T. 1 S., R. 6 E.	12.00	Apr. 30, 1914
Palmer, Bertha L., and E. Payne, and Plath, Louise B., and O. E.	Improvements on strip of land in NW. $\frac{1}{4}$ sec. 5, T. 1 S., R. E.	33.40	Nov. 4, 1914
Passey, Fred & Louisa.	0.30 A. in sec. 27, T. 1 N., R. 5 E.	43.00	Dec. 29, 1914
Peck, Thos. W., and Emma.	Improvements on tract of land in sec. 11, T. 1 S., R. 5 E.	12.60	Apr. 30, 1914
Peck, Fanny.	do.	13.60	Do.
Phillips, John J., and Cora L.	Improvements on tract of land in sec. 12, T. 1 S., R. 5 E.	5.00	May 20, 1914
Pine, C. W., and Mary L.	Improvements on strip of land in NE. $\frac{1}{4}$ of sec. 12, T. 1 S., R. 5 E.	52.60	June 12, 1914
Platner, Harry, and Melissa.	Improvements on tract of land in sec. 12, T. 1 S., R. 5 E.	14.60	May 30, 1914
Riordan, M. J.	Improvements on strip of land in sec. 12, T. 1 S., R. 5 E.	61.85	Jan. 25, 1915
Riordan, T. A.	Improvements on strip of land in sec. 10, T. 1 S., R. 5 E.	6.30	Do.
Ruse, James H., and Kathryn M.	Improvements on strip of land in SE. $\frac{1}{4}$ SW. $\frac{1}{4}$ , sec. 27, T. 1 N., R. 5 E.	92.00	July 9, 1914
Schornick, Geo., and Gertrude.	0.64 A. in SW. $\frac{1}{4}$ of sec. 5, T. 1 S., R. 6 E.	142.50	Apr. 24, 1915
Turner, G. F.	0.29 A. in NE. $\frac{1}{4}$ sec. 24, T. 1 N., R. 5 E.	50.00	Nov. 2, 1914
Tway, Ed. D., and Henrietta I.	Improvements on strip of land in SE. $\frac{1}{4}$ of sec. 11, T. 1 N., R. 5 E.	15.45	Nov. 14, 1914
Vance, John T., and Sarah E.	Crop and improvements and labor removing fence on strip of land in S. $\frac{1}{4}$ SE. $\frac{1}{4}$ , sec. 28, T. 1 N., R. 5 E.	100.00	Sept. 17, 1914
Vance, John T., and Sarah.	0.432 A. in S. $\frac{1}{4}$ SE. $\frac{1}{4}$ , sec. 28, T. 1 N., R. 5 E.	200.00	Dec. 23, 1914
Wallace, James Quinn.	Improvement on strip of land in SE. $\frac{1}{4}$ of sec. 19, T. 1 N., R. 6 E.	22.00	Oct. 28, 1914
Weekes, Fred C., and Margaret.	Improvements on strip of land in sec. 10, T. 1 S., R. 5 E.	12.00	May 20, 1914
Weekes, George D., and Gertrude E.	Improvements on tract of land in sec. 10, T. 1 S., R. 5 E.	20.90	May 29, 1914
Welch, E. S., and Ida.	Improvements on tract of land in sec. 7, T. 1 S., R. 6 E.	8.60	June 1, 1914
Do.	Improvements on strip of land in SW. $\frac{1}{4}$ of sec. 7, T. 1 S., R. 6 E.	51.00	Nov. 12, 1914

*Purchases of rights and property—Continued.*

## ARIZONA-CALIFORNIA, YUMA PROJECT.

Vendor.	Description.	Consideration.	Date of deed.
Biechteler, Ernest.....	Purchase of improvements on land in SW. $\frac{1}{4}$ SE. $\frac{1}{4}$ sec. 24, T. 8 S., R. 24 E., G. & S. R. M.	\$100.00	Aug. 24, 1914
Braun, E. M., and wife.....	Purchase of improvements on land in unit M., sec. 4, T. 16 S., R. 23 E., S. B. M., Yuma Reservation.	137.00	June 25, 1914
Clark, Oscar M., and wife.....	Purchase of improvements on land in unit H, fac. sec. 10, T. 16 S., R. 23 E., S. B. M., Yuma Reservation.	187.00	Nov. 19, 1914
Do.....	do.....	60.50	Feb. 25, 1915
Crane, Edward L., and wife..	Purchase of improvements on land in NE. $\frac{1}{4}$ sec. 33, T. 10 S., R. 24 W., G. & S. R. M.	62.00	Mar. 10, 1915
Miller, Willis H.....	Purchase of improvements on land in sec. 3, T. 16 S., R. 23 E., S. B. M.	370.00	Jan. 4, 1915
Edwards, Nelson T.....	Purchase of improvements on land in sec. 33, E. $\frac{1}{4}$ SW. $\frac{1}{4}$ , lots 4 and 5, T. 8 S., R. 24 W., G. & S. R. M.	282.00	Oct. 19, 1914
Fishbaugh, George.....	Purchase of improvements on land in NW. $\frac{1}{4}$ sec. 36, T. 9 S., R. 24 W., G. & S. R. M.	200.00	Apr. 2, 1914
Green, H. J., and wife.....	Purchase of improvements on land in sec. 3, T. 16 S., R. 23 E., S. B. M.	111.00	Oct. 28, 1914
Do.....	do.....	160.00	Apr. 6, 1915
Griswold, Alice M.....	Purchase of improvements on land in SE. $\frac{1}{4}$ SW. $\frac{1}{4}$ sec. 24, T. 8 S., R. 24 W., G. & S. R. M.	6.00	May 21, 1914
Hadley, B. O., and wife.....	Purchase of improvements on land in unit A, sec. 15, T. 16 S., R. 23 E., S. B. M., Yuma Reservation.	178.00	Dec. 31, 1914
Hobart, G. H., and wife.....	Purchase of improvements on land in SW. $\frac{1}{4}$ SW. $\frac{1}{4}$ frac. sec. 24, T. 8 S., R. 24 W., G. & S. R. M.	73.00	Oct. 31, 1914
Killian, Thomas, and wife....	Purchase of improvements on land in unit N, S. $\frac{1}{4}$ SW. $\frac{1}{4}$ SW. $\frac{1}{4}$ sec. 3, T. 16 S., R. 23 E., S. B. M.	127.00	June 15, 1914
Krupp, Michael, and wife.....	Purchase of improvements on land in N. $\frac{1}{4}$ SW. $\frac{1}{4}$ sec. 3, T. 10 S., R. 24 W., G. & S. R. M.	180.00	June 18, 1914
Lee, R. E., and wife.....	Purchase of improvements on land in E. $\frac{1}{4}$ SE. $\frac{1}{4}$ SW. $\frac{1}{4}$ frac. sec. 24, T. 24 W., G. & S. R. M.	102.00	June 11, 1914
Miller, B. E., and wife.....	Purchase of improvements on land in lot 7, unit F, sec. 3, T. 16 S., R. 23 E., S. B. M., Yuma Reservation.	80.00	May 18, 1914
Morrow, John T.....	Purchase of improvements on land in NW. $\frac{1}{4}$ NE. $\frac{1}{4}$ sec. 26, T. 8 S., R. 24 W., G. & S. R. M.	260.00	June 30, 1914
Morton, Jole H.....	Purchase of improvements on land in NW. $\frac{1}{4}$ NE. $\frac{1}{4}$ sec. 3, T. 9 S., R. 24 W., G. & S. R. M.	73.00	Nov. 19, 1914
Nelson, Gustave A., and wife.	Purchase of improvements on land in NE. $\frac{1}{4}$ NW. $\frac{1}{4}$ sec. 15, T. 16 S., R. 23 E., unit B, S. B. M., Yuma Reservation.	99.00	Dec. 29, 1914
Patterson, J. C., and wife.....	Purchase of improvements on land in SW. $\frac{1}{4}$ sec. 3, T. 9 S., R. 24 W., G. & S. R. M.	146.00	Dec. 22, 1914
Pirtle, Robert, and wife.....	Purchase of improvements on land in lot 10, unit G, sec. 3, T. 16 S., R. 23 E., S. B. M., Yuma Reservation.	165.00	Apr. 5, 1915
Sanford, Mary W.....	Purchase of improvements on land in lot 2, frac. sec. 24, T. 8 S., R. 24 W., G. & S. R. M.	180.00	May 25, 1914
Seamans, Scott, and wife....	Purchase of improvements on land in W. $\frac{1}{4}$ NW. $\frac{1}{4}$ SE. $\frac{1}{4}$ frac. sec. 24, T. 8 S., R. 24 W., G. & S. R. M.	60.00	May 18, 1914
Spieth, Adam A.....	Purchase of improvements on land in SE. $\frac{1}{4}$ SW. $\frac{1}{4}$ unit L, sec. 3, T. 16 S., R. 23 E., S. B. M., Yuma Reservation.	135.00	June 9, 1914
Thornton, Oscar P., and wife.	Purchase of improvements on land in lot 8, unit P, sec. 10, T. 16 S., R. 23 E., S. B. M., Yuma Reservation.	67.00	Aug. 11, 1914
Do.....	Purchase of improvements on land in frac. sec. 10, T. 16 S., R. 23 E., lot 8, unit P, S. B. M., Yuma Reservation.	137.00	Dec. 19, 1914
Thurman, Hattie L.....	Purchase of improvements on land in S. $\frac{1}{4}$ NW. $\frac{1}{4}$ sec. 26, T. 8 S., R. 24 W., G. & S. R. M.	104.00	Nov. 10, 1914

## CALIFORNIA, ORLAND PROJECT.

Frederick Laux, Jr.....	Strip of land across NE. $\frac{1}{4}$ SE. $\frac{1}{4}$ sec. 35, T. 18 N., R. 7 W., M. D. B. & M.	\$950.00	Apr. 27, 1914
Katharine Laux and Frederick Laux, Jr.	Strip of land across lots 5, 10, 11, 12, and 15, sec. 36, T. 18 N., R. 7 W., M. D. B. & M.	800.00	Oct. 10, 1914
William A. Glenn and wife...	Strip of land through SE. $\frac{1}{4}$ SW. $\frac{1}{4}$ sec. 33, T. 23 N., R. 4 W., M. D. B. & M.	325.00	Nov. 12, 1914

*Purchases of rights and property—Continued.*

## COLORADO, GRAND VALLEY PROJECT.

Vendor.	Description.	Consideration.	Date of deed.
Moore, Thomas B.....	Improvements on right of way across W. $\frac{1}{2}$ SW. $\frac{1}{2}$ SE. $\frac{1}{2}$ sec. 32, T. 1 N., R. 1 E., Ute M.	\$1,225.00	Nov. 14, 1914
Palisade Coal & Supply Co., The.	Improvements on right of way across S. $\frac{1}{2}$ SE. $\frac{1}{2}$ , sec. 4, T. 11 S., R. 98 W., 816th M.	5,600.00	Jan. 18, 1915

## COLORADO, UNCOMPAHGRE VALLEY PROJECT.

Alspach, R. E.....	Portion of SE. $\frac{1}{2}$ SE. $\frac{1}{2}$ NW. $\frac{1}{2}$ sec. 26, T. 50 N., R. 10 W., N. M. P. M., containing 0.30 acre, more or less.	\$1.00	Aug. 22, 1914
Barry, W. W.....	Portion of E. $\frac{1}{2}$ SW. $\frac{1}{2}$ SW. $\frac{1}{2}$ sec. 16, T. 15 S., R. 95 W., sixth P. M., containing 0.85 acre, more or less.	1.00	Mar. 3, 1915
Bartell, Elizabeth A.....	Portion of NW. $\frac{1}{2}$ NE. $\frac{1}{2}$ sec. 33, T. 15 S., R. 95 W., sixth P. M., containing 0.185 acre, more or less.	1.00	Aug. 12, 1914
Blamey, Mrs. D., and Wm. J.	Portion of SE. $\frac{1}{2}$ SE. $\frac{1}{2}$ sec. 29, T. 50 N., R. 9 W., N. M. P. M., containing 2.797 acres, more or less.	30.00	Sept. 23, 1914
Bodenhamer, B. F.....	Portion of NE. $\frac{1}{2}$ SE. $\frac{1}{2}$ sec. 22, T. 50 N., R. 10 W., N. M. P. M., containing 0.45 acre, more or less.	1.00	Sept. 30, 1914
Bonnell, Frank C.....	Portion of SE. $\frac{1}{2}$ SE. $\frac{1}{2}$ sec. 27, T. 15 S., R. 95 W., sixth P. M., containing 0.60 acre, more or less.	1.00	July 22, 1914
Bragg, Chas. W.....	Portion of N. $\frac{1}{2}$ NE. $\frac{1}{2}$ SE. $\frac{1}{2}$ sec. 15, T. 50 N., R. 10 W., N. M. P. M., containing 0.57 acre, more or less.	1.00	Aug. 19, 1914
Buddecke, A. E.....	Portion of NE. $\frac{1}{2}$ SE. $\frac{1}{2}$ and SE. $\frac{1}{2}$ SE. $\frac{1}{2}$ sec. 2, containing 0.36 acre, more or less, and a portion of NW. $\frac{1}{2}$ NW. $\frac{1}{2}$ sec. 12, at 11 in T. 50 N., R. 10 W., N. M. P. M., containing 0.50 acre, more or less.	1.00	Nov. 24, 1914
Byam, R. O., and Paul, S. A.	Portion of E. $\frac{1}{2}$ SW. $\frac{1}{2}$ sec. 36, T. 50 N., R. 10 W., N. M. P. M., containing 1.72 acres, more or less.	1.00	Aug. 22, 1914
Cade, Ellena B., and Martin..	Portion of SE. $\frac{1}{2}$ NE. $\frac{1}{2}$ sec. 20, T. 15 S., R. 95 W., sixth P. M., containing 0.15 acre, more or less.	1.00	Mar. 18, 1915
Christie, Laura J.....	Portion of NW. $\frac{1}{2}$ NW. $\frac{1}{2}$ sec. 19, T. 50 N., R. 9 W., N. M. P. M., containing 1.08 acres, more or less.	1.00	Nov. 24, 1914
Cofield, W. H.....	Portion of NE. $\frac{1}{2}$ NE. $\frac{1}{2}$ sec. 33, T. 15 S., R. 95 W., sixth P. M., containing 0.85 acre, more or less.	1.00	July 29, 1914
Conner, C. B., and Smith, C. R.	Portion of E. $\frac{1}{2}$ SE. $\frac{1}{2}$ SE. $\frac{1}{2}$ sec. 13, T. 50 N., R. 10 W., N. M. P. M., containing 0.55 acre, more or less.	1.00	Nov. 28, 1914
Corey, Paul R., and Brownell, R. D.	Portion of W. $\frac{1}{2}$ SW. $\frac{1}{2}$ SE. $\frac{1}{2}$ sec. 13, T. 50 N., R. 10 W., N. M. P. M., containing 0.31 acre, more or less.	1.00	Do.
Do.....	Portion of SW. $\frac{1}{2}$ NE. $\frac{1}{2}$ sec. 13, T. 50 N., R. 10 W., N. M. P. M., containing 0.42 acre, more or less.	1.00	Do.
Cummings, Paul J.....	Portion of NW. $\frac{1}{2}$ NW. $\frac{1}{2}$ sec. 26, T. 50 N., R. 10 W., N. M. P. M., containing 0.24 acre, more or less.	1.00	Aug. 31, 1914
Curtis, Linus E. <sup>1</sup> .....	Portion of S. $\frac{1}{2}$ NE. $\frac{1}{2}$ NW. $\frac{1}{2}$ sec. 22, T. 50 N., R. 10 W., N. M. P. M., containing 2.52 acres, more or less.	125.00	Sept. 9, 1914
Darling, Adam.....	Portion of SW. $\frac{1}{2}$ NW. $\frac{1}{2}$ and NW. $\frac{1}{2}$ SW. $\frac{1}{2}$ sec. 13, T. 50 N., R. 10 W., N. M. P. M., containing 1.48 acres, more or less.	1.00	Sept. 4, 1914
DeGuelle, A., and Ed.....	Portion of SE. $\frac{1}{2}$ SW. $\frac{1}{2}$ and SW. $\frac{1}{2}$ SE. $\frac{1}{2}$ sec. 12 and NW. $\frac{1}{2}$ NE. $\frac{1}{2}$ sec. 13, T. 50 N., R. 10 W., N. M. P. M., containing 1.64 acres, more or less.	1.00	Nov. 14, 1914
Deckerson, Ella <sup>1</sup> .....	Portion of N. $\frac{1}{2}$ NE. $\frac{1}{2}$ NW. $\frac{1}{2}$ sec. 22, T. 50 N., R. 10 W., N. M. P. M., containing 6.43 acres, more or less.	325.00	Sept. 9, 1914
Fairlamb, Millard.....	Portion of N. $\frac{1}{2}$ SW. $\frac{1}{2}$ sec. 16, T. 15 S., R. 95 W., sixth P. M., containing 0.63 acre, more or less.	1.00	Apr. 8, 1915
Fitts, Warren A.....	Portion of NE. $\frac{1}{2}$ NE. $\frac{1}{2}$ sec. 32, T. 50 N., R. 9 W., N. M. P. M., containing 0.02 acre, more or less.	1.00	Sept. 19, 1914
Harris, Abel W.....	Portion of NW. $\frac{1}{2}$ SW. $\frac{1}{2}$ sec. 12, T. 50 N., R. 10 W., N. M. P. M., containing 0.23 acre, more or less.	1.00	Oct. 1, 1914
Do.....	Portion of SW. $\frac{1}{2}$ NW. $\frac{1}{2}$ and N. W. $\frac{1}{2}$ SW. $\frac{1}{2}$ sec. 12, T. 50 N., R. 10 W., N. M. P. M., containing 0.94 acre, more or less.	1.00	Nov. 14, 1914

<sup>1</sup> Judgment fixing title to land in United States.

*Purchases of rights and property—Continued.*

## COLORADO, UNCOMPAHGRE VALLEY PROJECT—Continued.

Vendor.	Description.	Consideration.	Date of deed.
Hedgecock, Doris and Ernest, and Goddard, E. A.	Portion of NE. $\frac{1}{4}$ SW. $\frac{1}{4}$ sec. 12, T. 50 N., R. 10 W., N. M. P. M., containing 0.25 acre, more or less.	\$1.00	Nov. 24, 1914
Hobaugh, S. V.	Portion of S. $\frac{1}{4}$ NW. $\frac{1}{4}$ SW. $\frac{1}{4}$ sec. 14, and S. $\frac{1}{4}$ NE. $\frac{1}{4}$ SE. $\frac{1}{4}$ sec. 15, containing 0.66 acre, more or less; and a portion of SE. $\frac{1}{4}$ NE. $\frac{1}{4}$ sec. 15, T. 50 N., R. 10 W., N. M. P. M., containing 1.11 acres, more or less.	1.00	Oct. 2, 1914
Do.	Portion of SE. $\frac{1}{4}$ NE. $\frac{1}{4}$ sec. 15, and SW. $\frac{1}{4}$ NW. $\frac{1}{4}$ sec. 14, T. 50 N., R. 10 W., N. M. P. M., containing 1.58 acres, more or less.	225.00	Mar. 16, 1915
Hodge, Maude M., and Joseph C.	Portion of E. $\frac{1}{4}$ SE. $\frac{1}{4}$ sec. 1, T. 49 N., R. 10 W., N. M. P. M., containing 2.69 acres, more or less.	269.00	June 22, 1914
Huddleston, C. T.	Portion of NW. $\frac{1}{4}$ NW. $\frac{1}{4}$ sec. 23, and SW. $\frac{1}{4}$ SW. $\frac{1}{4}$ sec. 14, T. 50 N., R. 10 W., N. M. P. M., containing 2.61 acres, more or less.	1.00	Sept. 8, 1914
Independent Lumber Co.	Portion of SE. $\frac{1}{4}$ SE. $\frac{1}{4}$ sec. 11 and SW. $\frac{1}{4}$ SW. $\frac{1}{4}$ sec. 12, T. 50 N., R. 10 W., N. M. P. M., containing 0.47 acre, more or less.	1.00	Sept. 19, 1914
Krebs, J. F.	Portion of SE. $\frac{1}{4}$ SE. $\frac{1}{4}$ sec. 14, T. 50 N., R. 10 W., N. M. P. M., containing 0.26 acre, more or less; and a portion of SE. $\frac{1}{4}$ NE. $\frac{1}{4}$ sec. 14, T. 50 N., R. 10 W., N. M. P. M., containing 0.12 acre, more or less.	1.00	Nov. 25, 1914
Krisher, E. A., et al.	Portion of E. $\frac{1}{4}$ SW. $\frac{1}{4}$ and SW. $\frac{1}{4}$ SW. $\frac{1}{4}$ sec. 25, T. 50 N., R. 10 W., N. M. P. M., containing 2.19 acres, more or less.	1.00	Nov. 21, 1914
Lamb, Thomas E.	Portion of SW. $\frac{1}{4}$ SE. $\frac{1}{4}$ sec. 28, T. 15 S., R. 95 W., sixth P. M., containing 0.79 acre, more or less.	1.00	Aug. 3, 1914
Lester, John C.	Portion of N. $\frac{1}{4}$ NW. $\frac{1}{4}$ sec. 6, T. 49 N., R. 9 W., N. M. P. M., containing 0.62 acre, more or less.	1.00	Mar. 24, 1915
Lovell, J. Barton	Portion of NW. $\frac{1}{4}$ NW. $\frac{1}{4}$ sec. 29, T. 50 N., R. 9 W., N. M. P. M., containing 0.62 acre, more or less.	1.00	Jan. 13, 1915
McReynolds, John	Portion of NW. $\frac{1}{4}$ SW. $\frac{1}{4}$ sec. 5, T. 49 N., R. 9 W., N. M. P. M., containing 2.12 acres, more or less.	275.00	June 8, 1914
Marcon, James, et al.	Portion of NE. $\frac{1}{4}$ SW. $\frac{1}{4}$ sec. 27, T. 15 S., R. 95 W., sixth P. M., containing 0.44 acre, more or less.	1.00	Aug. 12, 1914
Marks, Constant R., and Bertha P.	Water right consisting of $\frac{1}{2}$ cubic foot per second of time in the Montrose and Delta Canal.	200.00	July 31, 1914
Mathews, Virgil A.	Portion of W. $\frac{1}{4}$ NW. $\frac{1}{4}$ SW. $\frac{1}{4}$ sec. 23, T. 50 N., R. 10 W., N. M. P. M., containing 0.18 acre, more or less.	1.00	Aug. 19, 1914
Maurer, E. H.	Portion of SE. $\frac{1}{4}$ NE. $\frac{1}{4}$ sec. 1, T. 49 N., R. 10 W., N. M. P. M., containing 3.49 acres, more or less.	100.00	Feb. 17, 1914
Maurer, E. H.	Portion of S. $\frac{1}{4}$ NE. $\frac{1}{4}$ and NW. $\frac{1}{4}$ NE. $\frac{1}{4}$ sec. 1, T. 49 N., R. 10 W., N. M. P. M., containing 2.23 acres, more or less.	1.00	Nov. 30, 1914
Montrose Title & Realty Co.	Selig or Eckerly Canal system (the consideration is to be paid in the form of a credit on the building charges and has not yet actually been paid).	12,600	Sept. 7, 1914
Naftel, J. F.	Portion of SE. $\frac{1}{4}$ SW. $\frac{1}{4}$ and NE. $\frac{1}{4}$ SW. $\frac{1}{4}$ sec. 31, T. 50 N., R. 9 W., N. M. P. M., containing 1.25 acres, more or less.	1.00	May 27, 1915
Nunn, L. L.	Portion of SW. $\frac{1}{4}$ NW. $\frac{1}{4}$ sec. 22, T. 15 S., R. 96 W., sixth P. M., containing 0.073 acre, more or less.	1.00	July 2, 1914
Pepper, I. N.	Portion of S. $\frac{1}{4}$ SE. $\frac{1}{4}$ and NW. $\frac{1}{4}$ SE. $\frac{1}{4}$ sec. 7, T. 49 N., R. 9 W., N. M. P. M., containing 6.095 acres, more or less; and a portion of NW. $\frac{1}{4}$ SE. $\frac{1}{4}$ sec. 7, T. 49 N., R. 9 W., N. M. P. M., containing 0.076 acre, more or less.	225.00	Nov. 28, 1914
Perkins, H. E.	Portion of SW. $\frac{1}{4}$ NE. $\frac{1}{4}$ sec. 3, T. 50 N., R. 10 W., N. M. P. M., containing 0.52 acre, more or less.	1.00	Aug. 19, 1914
Ripley, George H.	N. $\frac{1}{4}$ of block 1, Mountain View subdivision to the town of Olathe, Colo.	215.00	Mar. 17, 1915
Rogers, James F., et al.	Portion of NW. $\frac{1}{4}$ NE. $\frac{1}{4}$ sec. 32, and SW. $\frac{1}{4}$ SE. $\frac{1}{4}$ sec. 29, T. 50 N., R. 9 W., N. M. P. M., containing 3.45 acres, more or less.	300.00	Dec. 18, 1914
Rollin, Frederick C.	Water right, consisting of $\frac{1}{2}$ of a cubic foot per second of time in the Loutsenhizer Canal.	400.00	Apr. 28, 1915
Ross, Sarah	Portion of E. $\frac{1}{4}$ NE. $\frac{1}{4}$ sec. 18, T. 49 N., R. 9 W., N. M. P. M., containing 6.44 acres, more or less.	725.00	Dec. 3, 1914
Schambeck, D. J.	Portion of SW. $\frac{1}{4}$ SW. $\frac{1}{4}$ sec. 17, containing 4.55 acres; portion of W. $\frac{1}{4}$ SW. $\frac{1}{4}$ sec. 17, containing 2.58 acres, more or less; and portion of NW. $\frac{1}{4}$ SW. $\frac{1}{4}$ sec. 17, all in T. 49 N., R. 9 W., N. M. P. M., containing 2.381 acres, more or less.	715.00	Jan. 6, 1915

*Purchases of rights and property—Continued.*

## COLORADO, UNCOMPAHGRE VALLEY PROJECT—Continued.

Vendor.	Description.	Consideration.	Date of deed.
Selig Investment Co.....	Portion of NW. $\frac{1}{4}$ SE. $\frac{1}{4}$ and NE. $\frac{1}{4}$ SW. $\frac{1}{4}$ sec. 29, T. 50 N., R. 9 W., N. M. P. M., containing 1.45 acres, more or less.	\$1.00	Nov. 14, 1914
Smith, G. M.....	Portion of NE. $\frac{1}{4}$ NW. $\frac{1}{4}$ sec. 14, and SE. $\frac{1}{4}$ SW. $\frac{1}{4}$ sec. 11, T. 50 N., R. 10 W., N. M. P. M., containing 1.82 acres, more or less.	1.00	Aug. 31, 1914
Sneed, John M.....	Portion of SW. $\frac{1}{4}$ SW. $\frac{1}{4}$ sec. 32, T. 50 N., R. 10 W., N. M. P. M., containing 0.48 acre, more or less.	1.00	Jan. 20, 1915
St. James, Anna B.....	Portion of S. $\frac{1}{4}$ NW. $\frac{1}{4}$ sec. 6, T. 49 N., R. 9 W., N. M. P. M., containing 5.807 acres, more or less.	1,162.00	Mar. 30, 1915
Struble, Ralph Y. and Helen W.	Portion of SW. $\frac{1}{4}$ SW. $\frac{1}{4}$ sec. 23, T. 50 N., R. 10 W., N. M. P. M., containing 0.55 acre, more or less.	1.00	Sept. 3, 1914
Telco Investment Co.....	Portion of NE. $\frac{1}{4}$ NW. $\frac{1}{4}$ sec. 1, T. 49 N., R. 10 W., N. M. P. M., containing 1.64 acres, more or less.	1.00	Do.
Townsend, Thomas B.....	Portion of NE. $\frac{1}{4}$ SW. $\frac{1}{4}$ sec. 30, containing 0.27 acre, more or less; also portion of SW. $\frac{1}{4}$ SW. $\frac{1}{4}$ sec. 31, containing 0.57 acre, more or less; portion of NE. $\frac{1}{4}$ NE. $\frac{1}{4}$ sec. 31, containing 0.37 acre, more or less; portion of SE. $\frac{1}{4}$ NW. $\frac{1}{4}$ and NE. $\frac{1}{4}$ SW. $\frac{1}{4}$ sec. 19, containing 1.82 acres, more or less; portion of SE. $\frac{1}{4}$ SE. $\frac{1}{4}$ sec. 19 and NE. $\frac{1}{4}$ NE. $\frac{1}{4}$ sec. 30, containing 1.22 acres; portion of SW. $\frac{1}{4}$ NW. $\frac{1}{4}$ and NW. $\frac{1}{4}$ SW. $\frac{1}{4}$ sec. 29, containing 1.53 acres, more or less; all in T. 50 N., R. 9 W., N. M. P. M.	1.00	Oct. 14, 1914
Warren, J. F.....	Portion of NW. $\frac{1}{4}$ NE. $\frac{1}{4}$ sec. 35, T. 50 N., R. 10 W., N. M. P. M., containing 0.76 acres, more or less.	1.00	Nov. 14, 1914
Wigram, Lionel R.....	Portion of NE. $\frac{1}{4}$ NE. $\frac{1}{4}$ sec. 20, T. 15 S., R. 95 W., sixth P. M., containing 0.67 acre, more or less.	1.00	Apr. 8, 1915
Winks, George A.....	Portion of E. $\frac{1}{4}$ NW. $\frac{1}{4}$ SW. $\frac{1}{4}$ sec. 23, T. 50 N., R. 10 W., N. M. P. M., containing 0.29 acre, more or less.	1.00	Aug. 8, 1914
Wolfe, Charles, jr.....	Portion of NE. $\frac{1}{4}$ SE. $\frac{1}{4}$ sec. 18, containing 0.781 acre, more or less; also a portion of SE. $\frac{1}{4}$ NE. $\frac{1}{4}$ sec. 12, containing 0.356 acre, more or less, both in T. 49 N., R. 9 W., N. M. P. M.	1.00	June 8, 1914
Woolever, Margaret, Lillian, and Walter O.	Portion of W. $\frac{1}{4}$ SE. $\frac{1}{4}$ sec. 32, T. 15 S., R. 95 W., sixth P. M. containing 1.30 acres, more or less.	1.00	Aug. 24, 1914

## IDAHO, BOISE PROJECT.

Bahm, Charles.....	Construction of bridge in lieu of right of way, estimated cost.	\$115.00	Aug. 17, 1914
Baker, J. L.....	do.	110.00	Feb. 26, 1915
Barney, M. V.....	do.	110.00	May 8, 1915
Bennett, J. J.....	S. $\frac{1}{4}$ NE. $\frac{1}{4}$ sec. 2, T. 3 N., R. 2 W., containing 2.51 acres.	1.00	June 27, 1914
Bell, William R.....	NE. $\frac{1}{4}$ NW. $\frac{1}{4}$ and NW. $\frac{1}{4}$ NE. $\frac{1}{4}$ sec. 24, T. 4 N., R. 3 W., containing 6.88 acres.	1.00	Sept. 25, 1914
Do.....	NE. $\frac{1}{4}$ NW. $\frac{1}{4}$ sec. 24, T. 4 N., R. 3 W., containing 0.73 acre.	1.00	Oct. 21, 1914
Brown, E. N.....	SE. $\frac{1}{4}$ SE. $\frac{1}{4}$ sec. 14, T. 4 N., R. 3 W., containing 4.86 acres.	1.00	Sept. 26, 1914
Callaway, Mary J.....	SE. $\frac{1}{4}$ NW. $\frac{1}{4}$ sec. 21, T. 4 N., R. 3 W., containing 3.04 acres.	304.00	Sept. 18, 1914
Callaway, Abner Kenton.....	NE. $\frac{1}{4}$ NW. $\frac{1}{4}$ (lot 2) sec. 21, T. 4 N., R. 3 W., containing 0.99 acre.	99.00	Sept. 21, 1914
Canyon Abstract & Trust Co.	Construction of bridge in lieu of right of way; estimated cost.	110.00	Mar. 20, 1914
Clayton, A. H.....	do.	115.00	Sept. 24, 1914
Commissioner of Canyon County.	Construction of drops, waste-water channel, in E. $\frac{1}{4}$ SE. $\frac{1}{4}$ sec. 1, T. 2 N., R. 4 W.; one-half cost.	200.00	June 4, 1915
Cook, Ira C.....	NE. $\frac{1}{4}$ NE. $\frac{1}{4}$ sec. 24, T. 4 N., R. 3 W., containing 3.13 acres.	1.00	Nov. 5, 1914
Do.....	Lot 1, sec. 19, T. 4 N., R. 2 W., containing 2.29 acres.	1.00	Do.
Corn, M. W.....	Construction of bridge in lieu of right of way; estimated cost.	115.00	Sept. 29, 1914
Dille, L. S.....	Furnishing material for bridge in lieu of right of way; estimated cost.	110.00	Apr. 30, 1915
Eastman, Harlan P.....	Right of way for wagon road across sec. 10, T. 3 N., R. 6 E.	100.00	Feb. 25, 1915

*Purchases of rights and property—Continued.*

## IDAHO, BOISE PROJECT—Continued.

Vendor.	Description.	Consideration.	Date of deed.
First National Bank of Caldwell, Idaho.	Furnishing material for bridge in lieu of right of way; estimated cost.	\$110.00	Apr. 30, 1915
Frazier, W. C.	Construction of bridge in lieu of right of way; estimated cost.	115.00	Sept. 29, 1914
Frost, Elijah	NE. $\frac{1}{4}$ NW. $\frac{1}{4}$ and NW. $\frac{1}{4}$ NE. $\frac{1}{4}$ sec. 28, T. 4 N., R. 3 W., containing 3.28 acres.	410.00	Sept. 15, 1914
Gealy, Fred G. and Martha Ogden.	Construction of bridge in lieu of right of way; estimated cost.	110.00	Mar. 25, 1915
Gillesby, Thomas	NW. $\frac{1}{4}$ NW. $\frac{1}{4}$ sec. 2, T. 3 N., R. 2 W., containing 1.95 acres.	1.00	June 18, 1914
Grimes, G. A.	Construction of bridge in lieu of right of way; estimated cost.	115.00	May 6, 1914
Ingraham, M. V.	do.	115.00	Aug. 17, 1914
Johnson, W. E.	S. $\frac{1}{4}$ NW. $\frac{1}{4}$ sec. 2, T. 3 N., R. 2 W., containing 5.12 acres.	1.00	Aug. 11, 1914
Jones, Roy	Construction of bridge in lieu of right of way; estimated cost.	115.00	Aug. 26, 1914
Kendall, Samuel	S. $\frac{1}{4}$ NE. $\frac{1}{4}$ sec. 2, T. 3 N., R. 2 W., containing 3.56 acres.	1.00	June 30, 1914
Leonard, Charles R.	SE. $\frac{1}{4}$ sec. 33, T. 4 N., R. 2 W., containing 8.90 acres.	100.00	June 11, 1914
Mason, Cornelius	SW. $\frac{1}{4}$ NW. $\frac{1}{4}$ sec. 14, T. 4 N., R. 3 W., containing 3.73 acres.	1.00	Sept. 1, 1914
McElwain, L. S.	Construction of bridge in lieu of right of way; estimated cost.	115.00	Sept. 29, 1914
Milliner, George	SW. $\frac{1}{4}$ SW. $\frac{1}{4}$ sec. 27, T. 4 N., R. 3 W., containing 0.63 acres.	1.00	Aug. 11, 1914
Monoe, H. G.	SE. $\frac{1}{4}$ SE. $\frac{1}{4}$ sec. 10, T. 3 N., R. 2 W., containing 3.65 acres.	273.75	June 8, 1914
Morrow, Mary	Construction of bridge in lieu of right of way; estimated cost.	115.00	Aug. 26, 1914
Noble, Robt.	do.	115.00	Sept. 29, 1914
Olsen, Tollef	do.	115.00	Aug. 26, 1914
O'Malley, C. C., and wife	NE. $\frac{1}{4}$ sec. 15, T. 3 N., R. 2 W., containing 2.17 acres.	200.00	Oct. 13, 1914
Parrish, Wallace	Purchase of Hot Springs placer claims.	700.00	Apr. 4, 1914
Paynter, I. N.	SW. $\frac{1}{4}$ SE. $\frac{1}{4}$ sec. 14, T. 4 N., R. 3 W., containing 2.57 acres.	1.00	Sept. 26, 1914
Preston, H. M.	NE. $\frac{1}{4}$ NW. $\frac{1}{4}$ sec. 2, T. 3 N., R. 2 W., containing 0.93 acres.	1.00	June 18, 1914
Quirk, Bridget	Lot 1, sec. 16, SE. $\frac{1}{4}$ SE. $\frac{1}{4}$ sec. 9, SW. $\frac{1}{4}$ SW. $\frac{1}{4}$ and lot 4, sec. 10; lot 3, sec. 15, T. 3 N., R. 5 E., containing in all 132.1 acres.	4,500.00	Jan. 2, 1915
Roberts, Mrs. Ada	SE. $\frac{1}{4}$ SW. $\frac{1}{4}$ and SW. $\frac{1}{4}$ SE. $\frac{1}{4}$ sec. 21, T. 4 N., R. 3 W., containing 3.16 acres.	316.00	Sept. 15, 1914
Ross, Franklin P.	W. $\frac{1}{4}$ NW. $\frac{1}{4}$ sec. 6, T. 3 N., R. 6 E., also Ferry placer claim; 25.3 acres in above tract.	2,500.00	Feb. 2, 1914
Rowland, J. F.	Furnishing material for bridge in lieu of right of way; estimated cost.	110.00	Mar. 15, 1915
Russell, C. P.	Construction of bridge in lieu of right of way; estimated cost.	115.00	Aug. 26, 1914
Scott, C. B.	do.	115.00	Aug. 26, 1914
Sproat, David	Construction of two bridges in lieu of improvements destroyed; estimated cost.	100.00	Oct. 3, 1914
Stone, F. S.	Construction of bridge in lieu of right of way; estimated cost.	115.00	Aug. 26, 1914
Stoner, William	S. $\frac{1}{4}$ SE. $\frac{1}{4}$ sec. 1, T. 3 N., R. 2 W., containing 5.78 acres.	1.00	June 30, 1914
Vaughn, W. R.	NW. $\frac{1}{4}$ NE. $\frac{1}{4}$ sec. 24, T. 4 N., R. 3 W., containing 1.46 acres.	1.00	Sept. 26, 1914
Van Slyke, A. W.	Construction of bridge in lieu of right of way; estimated cost.	115.00	Sept. 29, 1914
Vassar, S. H.	SW. $\frac{1}{4}$ SW. $\frac{1}{4}$ sec. 13, and NW. $\frac{1}{4}$ NW. $\frac{1}{4}$ sec. 24, T. 4 N., R. 3 W., containing 3.91 acres.	1.00	Oct. 5, 1914
Vinson, H. I.	Construction of bridge in lieu of right of way; estimated cost.	115.00	Sept. 29, 1914
Walling, Benjamin F.	NE. $\frac{1}{4}$ sec. 15, T. 3 N., R. 2 W., containing 0.45 acres.	100.00	June 1, 1914
Weick, William	Construction of bridge in lieu of right of way; estimated cost.	110.00	Apr. 30, 1914
Wells, C. S.	NW. $\frac{1}{4}$ SE. $\frac{1}{4}$ sec. 14, T. 4 N., R. 3 W., containing 2.57 acres.	1.00	Sept. 26, 1914
Western National Bank	Lots 6, 7, 8, 9, 18, 19, 20, 21, blk. 13; lots 6, 7, 8, 9, 18, 19, 20, 21, blk. 14; lots 6, 7, 8, 9, 18, 19, 20, 21, blk. 15; lots 6, 7, 8, 9, blk. 16, Cupps addition to Caldwell.	840.00	Oct. 6, 1914



*Purchases of rights and property—Continued.*

## IDAHO, MINIDOKA PROJECT.

Vendor.	Description.	Consideration.	Date of deed.
Baker, King D., and Wm. B. Morgart.	Purchase of lateral 36 in sec. 20, T. 9 S., R. 25 E., B. M.	\$100.00	Nov. 29, 1914
Becknell, D. G.	Payment for damages to improvements on farm unit F, sec. 18, T. 10 S., R. 24 E., B. M.	55.25	July 27, 1914
Boyer, Marvin L.	Purchase of portion of lateral 104-2½ in sec. 9, T. 10 S., R. 23 E., B. M.	30.00	Jan. 11, 1915
Brimm, W. W., and Edw. B. Johnson.	Purchase of lateral 434-2 in sec. 23, T. 10 S., R. 23 E., B. M.	93.70	Aug. 29, 1914
Bruns, Henry C.	Damage to improvement, farm unit G, sec. 24, T. 9 S., R. 23 E.	24.75	Aug. 17, 1914
Burley Townsite Co.	Lot 3, block 139, Burley, Idaho.	172.04	Apr. 7, 1914
Clark, Thos. E., and James O. Ellis.	Purchase of lateral 1516½, in sec. 29, T. 9 S., R. 23 E., B. M.	25.60	Dec. 19, 1914
Denning, Albert P.	Purchase of lateral 186-3½ in sec. 4, T. 10 S., R. 23 E., B. M.	100.00	Nov. 19, 1914
Dunham, W. E.	Purchase of laterals 99-A and 99-A1 in sec. 23, T. 10 S., R. 23 E., B. M.	91.00	Dec. 31, 1914
Ellis, James O., and Peter Hansen.	Purchase of lateral 1517-1 in sec. 29, T. 9 S., R. 23 E., B. M.	20.80	July 1, 1914
Elsea, Josie Acuff.	Damage to improvements on farm unit H, sec. 15, T. 9 S., R. 23 E., B. M.	17.75	June 12, 1914
Emigh, Roy.	56.5 acres sec. 16, T. 9 S., R. 27 E., B. M.	1,977.50	Nov. 28, 1913
Farrabee, Irvin L.	Damage to improvements on farm unit E, sec. 8, T. 9 S., R. 24 E., B. M.	23.75	May 25, 1914
Flake, Wm. J.	Damage to improvements on farm unit D, sec. 14, T. 9 S., R. 24 E.	38.00	Sept. 24, 1914
Hall, Orrin S.	Damage to improvements on farm unit H, sec. 25, T. 9 S., R. 22 E., B. M.	35.75	Oct. 7, 1914
Hardy, W. B., et al.	Purchase of portion of lateral 65 in sec. 29, T. 9 S., R. 24 E., B. M.	180.45	Aug. 29, 1914
Hellewell, Martha J.	Damage to improvements on farm unit C, sec. 32, T. 9 S., R. 23 E.	86.75	Jan. 28, 1915
Hollenbeck, Clarence D.	Damage to improvements on farm unit F, sec. 23, T. 9 S., R. 22 E., B. M.	6.25	Sept. 25, 1914
Holley, Eddie C.	Damage to improvements on farm unit P, sec. 10, T. 10 S., R. 23 E.	5.25	Dec. 15, 1914
Hrusa, James, and Albert Romig.	Purchase of lateral 25½ in sec. 33, T. 8 S., R. 25 E., B. M.	75.00	Apr. 25, 1914
Huggins, Geo., et al.	Purchase of lateral 134-B2C1 in secs. 9 and 10, T. 9 S., R. 24 E., B. M.	227.16	Nov. 13, 1914
Kelley, Ira H.	Purchase of portion of lateral 65, sec. 29, T. 9 S., R. 24 E., B. M.	60.15	Feb. 16, 1915
Leaf, C. C.	Damage to improvements on farm unit D, sec. 15, T. 9 S., R. 23 E., B. M.	9.25	Sept. 25, 1914
Lord, Anna M., et al.	Purchase of lateral 184 in sec. 35, T. 9 S., R. 23 E., B. M.	71.00	July 29, 1914
Lowry, Noah C.	Damage to improvements on farm unit F, sec. 11, T. 10 S., R. 23 E., B. M.	17.75	May 25, 1914
Lucas, Walter T.	Purchase of lateral 312-3 in sec. 11, T. 10 S., R. 24 E., B. M.	42.60	Dec. 7, 1914
Lynn, Mrs. Isabelle.	Purchase of lateral 411 in sec. 22, T. 9 S., R. 24 E., B. M.	30.00	Aug. 29, 1914
Monour, Harve.	Damage to improvements on farm unit C, sec. 12, T. 10 S., R. 23 E., B. M.	31.75	May 25, 1914
Parker, Mrs. F. L.	Damage to improvements on farm unit J, sec. 9, T. 10 S., R. 23 E., B. M.	29.75	Mar. 1, 1915
Richards, Earl R.	Damage to improvements on farm unit L, sec. 31, T. 9 S., R. 24 E., B. M.	35.75	Jan. 26, 1915
Sartain, W. Herbert.	Purchase of lateral 810 in sec. 19, T. 10 S., R. 24 E., B. M.	26.00	Nov. 19, 1914
Do.	Damage to improvements on farm unit G, sec. 19, T. 10 S., R. 24 E., B. M.	17.25	June 10, 1914
Shafer, Ed.	Purchase of lateral 311-A in sec. 1, T. 10 S., R. 24 E., B. M.	51.40	Dec. 7, 1914
Smith, Henry Z.	Damage to improvements on farm unit J, sec. 7, T. 9 S., R. 24 E., B. M.	49.75	June 10, 1914
Snyder, Matilda C.	Damage to improvements on farm unit C, sec. 11, T. 9 S., R. 24 E., B. M.	9.75	Do.
Spencer, Ira A.	Damage to improvements on farm unit G, sec. 18, T. 10 S., R. 24 E., B. M.	5.25	June 11, 1914
Do.	Purchase of lateral 1014-2½ in sec. 18, T. 10 S., R. 24 E., B. M.	20.00	Aug. 29, 1914
State of Idaho.	260.9 acres in secs. 16 and 36, T. 9 S., R. 27 E.; sec. 36, T. 8 S., R. 26 E.; sec. 16, T. 9 S., R. 26 E.; sec. 16, T. 9 S., R. 29 E., B. M.	2,609.00	May 4, 1915
True, F. W.	Damage to improvements on farm unit J, sec. 11, T. 10 S., R. 23 E., B. M.	3.75	Dec. 24, 1912
Whitson, Geo. L.	Damage to improvements on farm unit F, sec. 2, T. 10 S., R. 22 E., B. M.	13.75	May 22, 1914
Yalgie, Louis.	Damage to improvements on farm unit N, sec. 14, T. 10 S., R. 23 E., B. M.	42.75	Jan. 29, 1915

*Purchases of rights and property—Continued.*

## MONTANA, FLATHEAD (INDIAN) PROJECT.

Vendor.	Description.	Consideration.	Date of deed.
Northern Pacific Railway Co.	Flowage rights Little Bitter Root Lake, SW. $\frac{1}{4}$ NE. $\frac{1}{4}$ sec. 15, T. 27 N., R. 24 W., M. P. M.	\$1.00	Apr. 26, 1915
Anaconda Copper Mining Co..	Flowage rights Little Bitter Root Lake, part of lot 6, sec. 5, T. 27 N., R. 24 W., and SE. $\frac{1}{4}$ SE. $\frac{1}{4}$ sec. 35, T. 28 N., R. 25 W., below contour 3706.	1.00	Apr. 30, 1915
Lewis W. Kelsey and wife....	Flowage rights Little Bitter Root Lake, lots 13, 15, 16, sec. 6, and lots 1, 2, 3, 4, 5, 6, and 7, sec. 16, T. 27 N., R. 24 W.	1.00	Nov. 2, 1914
A. D. Smith.....	Telephone right of way through NE. $\frac{1}{4}$ NE. $\frac{1}{4}$ sec. 22, T. 20 N., R. 21 W.	5.00	June 22, 1914
Louie Loseau.....	Telephone right of way through E. $\frac{1}{4}$ SE. $\frac{1}{4}$ and SW. $\frac{1}{4}$ SE. $\frac{1}{4}$ sec. 15, T. 20 N., R. 21 W.	1.00	Apr. 7, 1914

## MONTANA, MILK RIVER PROJECT.

Clement, Preston S. and Georgia.	163.62 acres in lot 1, sec. 10, NW. $\frac{1}{4}$ and lots 2, 3, and 5, sec. 11, T. 30 N., R. 36 E., M. P. M.	\$1,068.65	May 12, 1914
Durell, B. S. and Alonzo.....	Easement over land in SE. $\frac{1}{4}$ sec. 26, T. 28 N., R. 40 E.	1,188.83	Feb. 19, 1915
Do.....	2.08 acres in S. $\frac{1}{4}$ NE. $\frac{1}{4}$ , SE. $\frac{1}{4}$ SE. $\frac{1}{4}$ , and SE. $\frac{1}{4}$ SE. $\frac{1}{4}$ sec. 36, T. 28 N., R. 40 E.	511.17	
Lenz, Adam.....	Sale of improvements and damages to property in N. $\frac{1}{4}$ SW. $\frac{1}{4}$ sec. 28, and lot 13, sec. 29, T. 28 N., R. 40 E.	6.00	Dec. 10, 1914
Montana, State of.....	E. $\frac{1}{4}$ NE. $\frac{1}{4}$ , NW. $\frac{1}{4}$ SE. $\frac{1}{4}$ , S. $\frac{1}{4}$ SW. $\frac{1}{4}$ , sec. 34, N. $\frac{1}{4}$ NW. $\frac{1}{4}$ sec. 35, T. 32 N., R. 32 E.	2,800.00	Sept. 21, 1914
Skinner, W. W.....	Sale of improvements and damages to property in secs. 31, 32, 34, T. 31 N., R. 36 E., and sec. 3, T. 30 N., R. 36 E.	200.00	Dec. 15, 1914
Wooldridge, Wm. and Nettie E.	Easement over land in sec. 3, T. 30 N., R. 36 E., and secs. 32 and 34, T. 31 N., R. 36 E.	960.68	Nov. 18, 1912 Feb. 27, 1914

## MONTANA, SUN RIVER PROJECT.

State of Montana.....	Beginning at SW. corner of SE. $\frac{1}{4}$ NW. $\frac{1}{4}$ sec. 4; thence north 0° 0' E. along W. boundary of SE. $\frac{1}{4}$ NW. $\frac{1}{4}$ sec. 4, 652.9 feet; thence south 31° 50' E. 159.7 feet; thence left along an arc of 1,065 feet radius 154.1 feet; thence south 40° 12' E. 153.7 feet; thence to right along an arc 855 feet radius 76.6 feet; thence S. 35° 4' E. 38.3 feet; thence to left along an arc of 816.2 feet radius 163.8; thence south 46° and 34' E. 20.4 feet; thence to right along an arc of 473 feet radius 23.5 feet to a point on S. boundary line of SE. $\frac{1}{4}$ of NW. $\frac{1}{4}$ sec. 4; thence due west along said boundary line 481.2 feet to point of beginning; 3.44 acres.	\$34.40	June 20, 1914
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## MONTANA-NORTH DAKOTA, LOWER YELLOWSTONE PROJECT.

Northey, R. A. and A. E.....	Damages to improvements S. $\frac{1}{4}$ NW. $\frac{1}{4}$ SW. $\frac{1}{4}$ and SW. $\frac{1}{4}$ SW. $\frac{1}{4}$ of sec. 15, T. 23 N., R. 59 E., M. P. M., and the NW. $\frac{1}{4}$ NE. $\frac{1}{4}$ of sec. 21, T. 23 N., R. 59 E.	\$200.00	Aug. 25, 1914
Northey, W. L. and I. B.....	Damages to improvements, SW. $\frac{1}{4}$ NE. $\frac{1}{4}$ sec. 15, T. 23 N., R. 59 E., M. P. M.	100.00	Sept. 1, 1914
Loving, Sylvia H., and Loving, Sylvia H., executrix.	2 acres in sec. 24, 25.6 acres in sec. 25, 7.1 acres in sec. 30, 1.7 acres in sec. 31, right of way through, over, and upon sec. 25, all in T. 22 N., R. 58 E., M. P. M.	238.00	Sept. 29, 1914

## NEBRASKA-WYOMING, NORTH PLATTE PROJECT.

Pearson, Addison F., and wife.	Right of way for drainage ditch across N. $\frac{1}{4}$ NW. $\frac{1}{4}$ sec. 28, T. 22 N., R. 53 W.	\$1.00	May 15, 1915
Townsend, Harry M., and wife.	Right of way for drainage ditch across SE. $\frac{1}{4}$ SE. $\frac{1}{4}$ sec. 20, T. 22 N., R. 53 W.	1.00	June 23, 1915

*Purchases of rights and property—Continued.*

NEVADA, TRUCKEE-CARSON PROJECT.

Vendor.	Description.	Consideration.	Date of deed.
Riley, Patrick, and wife.....	Part of NE. $\frac{1}{4}$ SW. $\frac{1}{4}$ and lot 3 sec. 18, T. 20 N., R. 24 E., M. D. M., a strip of land 200 feet wide for canal right of way.	\$1.00	July 22, 1914
Moore, R. H., and wife.....	Strip of land, 100 feet wide, through E. $\frac{1}{4}$ SW. $\frac{1}{4}$ sec. 28, N. $\frac{1}{4}$ NE. $\frac{1}{4}$ sec. 33, W. $\frac{1}{4}$ NW. $\frac{1}{4}$ sec. 34, T. 19 N., R. 29 E., M. D. M., for canal right of way.	100.00	Sept. 25, 1914
Southern Pacific Co.....	Parts of the SW. $\frac{1}{4}$ NE. $\frac{1}{4}$ S. $\frac{1}{4}$ NW. $\frac{1}{4}$ and NW. $\frac{1}{4}$ SE. $\frac{1}{4}$ sec. 19, T. 20 N., R. 26 E., M. D. M., 38 acres for Truckee Dam site.	822.50	Dec. 5, 1914
	Parts of S. $\frac{1}{4}$ NW. $\frac{1}{4}$ sec. 19, T. 20 N., R. 23 E., M. D. M., and SE. $\frac{1}{4}$ NE. $\frac{1}{4}$ sec. 24, T. 20 N., R. 22 E., M. D. M., 23 acres for Truckee Dam site.	920.00	Do.
Truckee River General Electric Co.	A perpetual easement covering 14 acres of land, being parts of NW. $\frac{1}{4}$ NE. $\frac{1}{4}$ and NE. $\frac{1}{4}$ NW. $\frac{1}{4}$ sec. 7, T. 15 N., R. 17 E., M. D. M., together with outlet works consisting of a concrete dam and gates for regulating Lake Tahoe Reservoir.	139,500.00	June 28, 1915
Winder, E. L., and wife.....	Quitclaim deed for right in ditch across N. $\frac{1}{4}$ S. V. $\frac{1}{4}$ sec. 27, T. 19 N., R. 30 E., M. D. M., for Government lateral.	1.00	Nov. 7, 1914

NEW MEXICO-TEXAS, RIO GRANDE PROJECT.

Armijo, Antonia M.....	Improvements on right of way in sec. 1, T. 26 S., R. 2 E., N. M. P. M.	\$1.00	Jan. 15, 1914
Chamberino Community Ditch Co.	Easement for right of way in sec. 7, T. 26 S., R. 3 E., N. M. P. M.	1.00	Nov. 27, 1914
City National Bank of El Paso, Tex.	Improvements on right of way in secs. 1 and 12, T. 26 S., R. 2 E., N. M. P. M.	310.00	Jan. 18, 1915
Corpening, John K., and wife.	A strip of land in sec. 35, T. 26 S., R. 2 E., N. M. P. M., containing 3.40 acres.	500.00	June 26, 1915
Esterbrook, W. Penn, Virgie, and E. Dorothy.	A strip of land in sec. 9, T. 26 S., R. 2 E., N. M. P. M., containing 3.01 acres.	700.00	June 9, 1915
Lucerne Farm Co.....	Improvements on a strip of land in sec. 7, T. 26 S., R. 3 E., N. M. P. M.	1,107.50	Nov. 25, 1914
Martinez, Manuel.....	A strip of land in sec. 25, T. 26 S., R. 2 E., N. M. P. M., containing 0.69 acre.	69.00	Jan. 18, 1915
Mayer, Max, and wife.....	A strip of land in sec. 15, T. 26 S., R. 3 E., N. M. P. M., containing 2.97 acres.	471.20	June 24, 1915
Mundy, J. J., and wife, and Fink, W. W., and wife.	A strip of land in sec. 15, T. 26 S., R. 2 E., N. M. P. M., containing 10.76 acres.	200.00	Apr. 16, 1915
Robertson, G. W.....	Purchase of improvements on land in sec. 15, T. 26 S., R. 2 E., N. M. P. M.	20.00	Jan. 31, 1914
Robbins, J. C., and wife.....	A strip of land in secs. 11 and 12, T. 24 S., R. 1 E., N. M. P. M., containing 12.57 acres.	650.00	Apr. 30, 1915
Stevens, Charles B.....	Purchase of improvements on land in sec. 26, T. 25 S., R. 2 E., N. M. P. M.	84.80	Jan. 29, 1914
Want, L. B., and wife.....	Purchase of improvements on land in sec. 7, T. 26 S., R. 3 E., N. M. P. M.	25.00	Oct. 29, 1914
Rogers, J. A., and wife.....	Donation of a strip of land 80 feet wide for right of way for Ascarate wasteway, containing 0.197 acre.	1.00	Apr. —, 1915
Pedregon, Catarino, and wife.	Donation of a strip of land 80 feet wide for right of way for Ascarate wasteway, containing 0.714 acre.	1.00	Dec. 21, 1914
Davis, Chas., et al.....	Donation of a strip of land 80 feet wide for right of way for Ascarate wasteway, containing 0.735 acre.	1.00	Apr. 12, 1915
Hart, Juan S.....	Strip of land near Hart's mill, containing 1.50 acres, for right of way for Franklin Canal.	1.00	Jan. 17, 1914
San Miguel Community Ditch Co.	Easement for right of way for various crossings for East and West Side Canals, aggregating a total of 2.94 acres, as follows: 1.37 acres in sec. 13, T. 24 S., R. 1 E.; 0.32 acre in sec. 32; 0.43 acre in sec. 33, T. 24 S., R. 2 E.; 0.82 acre in sec. 4, T. 26 S., R. 2 E., N. M. P. M.	1.00	Dec. 30, 1914

OREGON, UMATILLA PROJECT.

West, J. S. and Adora E.....	Part SE. $\frac{1}{4}$ S. W. $\frac{1}{4}$ sec. 33, T. 5 N., R. 23 E., W. M.	\$1,035.00	June 17, 1914
Camp, J. G. and Eva M.....	Part NE. $\frac{1}{4}$ NE. $\frac{1}{4}$ sec. 22, T. 5 N., R. 27 E., W. M.	1.00	June 24, 1914
Western Land & Irrigation Co.	Part SW. $\frac{1}{4}$ SW. $\frac{1}{4}$ sec. 17, T. 5 N., R. 23 E., W. M.	1.00	Oct. 26, 1914

<sup>1</sup> Decree and judgment.

*Purchases of rights and property—Continued.*

## OREGON-CALIFORNIA KLAMATH PROJECT.

Vendor.	Description.	Consideration.	Date of deed.
Adams, J. Frank.....	Part lot 2, sec. 3, T. 41, R. 10.....	\$1.00	Dec. 17, 1913
Barnes, J. H.....	Part SW. $\frac{1}{4}$ NW. $\frac{1}{4}$ sec. 13, T. 40, R. 9.....	1.00	Oct. 7, 1914
Do.....	Part SW. $\frac{1}{4}$ NW. $\frac{1}{4}$ sec. 13, T. 40, R. 9.....	1.00	Do.
Dixon, J. R.....	Part SW. $\frac{1}{4}$ SW. $\frac{1}{4}$ sec. 24, T. 39, R. 9, SE. $\frac{1}{4}$ SE. $\frac{1}{4}$ sec. 23, T. 39, R. 9.....	1.00	Dec. 12, 1914
Davis, Alex. A.....	Part SE. $\frac{1}{4}$ SE. $\frac{1}{4}$ E. $\frac{1}{4}$ W. $\frac{1}{4}$ SE. $\frac{1}{4}$ sec. 15, T. 39, R. 9.....	1.00	May 4, 1915
Elllott, J. K.....	Part N. $\frac{1}{4}$ SW. $\frac{1}{4}$ sec. 25, T. 39, R. 9.....	1.00	Oct. 1, 1914
Graves, Eva M.....	Part SW. $\frac{1}{4}$ NW. $\frac{1}{4}$ sec. 27, T. 39, R. 9.....	1.00	Mar. 1, 1915
Hauger, Fritz R.....	Part lots 5, 12, 13, sec. 21, T. 39, R. 9.....	1.00	May 6, 1915
Hill, W. F.....	Part E. $\frac{1}{4}$ NE. $\frac{1}{4}$ NW. $\frac{1}{4}$ NE. $\frac{1}{4}$ sec. 35, T. 40, R. 10.....	1.00	July 7, 1914
Do.....	Part E. $\frac{1}{4}$ NE. $\frac{1}{4}$ sec. 35, T. 40, R. 10.....	1.00	Do.
Do.....	Part SE. $\frac{1}{4}$ SW. $\frac{1}{4}$ sec. 26, T. 40, R. 10.....	1.00	July 29, 1914
Mason, W. H.....	Part NE. $\frac{1}{4}$ NW. $\frac{1}{4}$ NW. $\frac{1}{4}$ NE. $\frac{1}{4}$ sec. 27, T. 39, R. 9; part SE. $\frac{1}{4}$ SW. $\frac{1}{4}$ SW. $\frac{1}{4}$ SE. $\frac{1}{4}$ sec. 22, T. 39, R. 9.....	1.00	Sept. 5, 1914
Do.....	Part NE. $\frac{1}{4}$ NW. $\frac{1}{4}$ NW. $\frac{1}{4}$ NE. $\frac{1}{4}$ sec. 27, T. 39, R. 9.....	1.00	Sept. 4, 1914
Merrill, N. S.....	Part W. $\frac{1}{4}$ SE. $\frac{1}{4}$ S. $\frac{1}{4}$ SW. $\frac{1}{4}$ NE. $\frac{1}{4}$ sec. 2, T. 41, R. 10.....	1.00	July 20, 1914
Merrill, C. Guy.....	Part W. $\frac{1}{4}$ NE. $\frac{1}{4}$ sec. 2, T. 41, R. 10.....	1.00	July 29, 1914
Melhaase, Fred.....	Part SW. $\frac{1}{4}$ SW. $\frac{1}{4}$ sec. 30, T. 39, R. 10.....	1.00	Nov. 3, 1914
Melhaase, Fred, et al.....	Part SW. $\frac{1}{4}$ SW. $\frac{1}{4}$ sec. 30, T. 39, R. 10.....	50.00	Do.
Miller, L. M.....	Part SE. $\frac{1}{4}$ sec. 16, T. 39, R. 9.....	1.00	Apr. 23, 1915
Morrill, John F.....	Part SE. $\frac{1}{4}$ NW. $\frac{1}{4}$ NE. $\frac{1}{4}$ SW. $\frac{1}{4}$ SW. $\frac{1}{4}$ NE. $\frac{1}{4}$ NW. $\frac{1}{4}$ SE. $\frac{1}{4}$ sec. 23, T. 39, R. 9.....	1.00	Jan. 9, 1915
Schoenfeld, Otto.....	Part NE. $\frac{1}{4}$ SE. $\frac{1}{4}$ sec. 26, T. 39, R. 9.....	1.00	Sept. 11, 1914
Whitman, Sarah, et al.....	Part SW. $\frac{1}{4}$ NW. $\frac{1}{4}$ sec. 22, T. 39, R. 10.....	605.11	May 7, 1915
Willits, L. F.....	Part SE. $\frac{1}{4}$ SE. $\frac{1}{4}$ sec. 31, T. 39, R. 10.....	1.00	May 21, 1915
Worden, Chas. E.....	Part SW. $\frac{1}{4}$ sec. 25, T. 39, R. 9.....	1.00	Sept. 26, 1914
Zlabek, Ferdinand.....	Part SW. $\frac{1}{4}$ SE. $\frac{1}{4}$ sec. 35, T. 40, R. 10.....	1.00	Sept. 14, 1914

## UTAH, STRAWBERRY VALLEY PROJECT.

Ahlin, John Axel and Christina.	A strip of land containing 1.41 acres in W. $\frac{1}{4}$ of NE. $\frac{1}{4}$ of sec. 36, T. 9 S., R. 1 E., S. L. B. M.	\$194.00	Apr. 8, 1915
Amos, John and Parmella....	A strip of land 150 feet wide in SE. $\frac{1}{4}$ of SW. $\frac{1}{4}$ of sec. 16, T. 9 S., R. 2 E., S. L. B. M., containing 1.78 acres.	106.00	Dec. 26, 1914
Amos, John Harvey and Estelle, and Amos, W. T. and Ella.	A tract of land in SW. $\frac{1}{4}$ of SE. $\frac{1}{4}$ of sec. 16, T. 9 S., R. 2 E., S. L. B. M., containing 0.033 acre.	1.00	Apr. 3, 1915
Blixt, Peter O.....	A strip of land in NE. $\frac{1}{4}$ of SE. $\frac{1}{4}$ of sec. 36, T. 9 S., R. 1 E., S. L. B. M., containing 1.73 acres.	375.00	Mar. 29, 1915
Borgeson, Andrew A.....	A strip of land in NW. $\frac{1}{4}$ of NW. $\frac{1}{4}$ of sec. 35, T. 9 S., R. 1 E., S. L. B. M., containing 0.70 acre.	110.00	Mar. 22, 1915
Borgeson, Lizzie O.....	A strip of land in NW. $\frac{1}{4}$ of NW. $\frac{1}{4}$ of sec. 35, T. 9 S., R. 1 E., S. L. B. M., containing 0.67 acre.	90.00	May 4, 1915
Borgeson, Nettie L.....	A strip of land in NW. $\frac{1}{4}$ of NW. $\frac{1}{4}$ of sec. 35, T. 9 S., R. 1 E., S. L. B. M., containing 0.84 acre.	110.00	Mar. 9, 1915
Boyd, John D. and Hannah..	A strip of land in NE. $\frac{1}{4}$ of NW. $\frac{1}{4}$ of sec. 36, T. 9 S., R. 1 E., S. L. B. M., containing 1.48 acres.	175.00	Apr. 12, 1915
Broadbent, James T. and Sarah Alice.	A strip of land in NW. $\frac{1}{4}$ of NE. $\frac{1}{4}$ containing 0.60 acre, also in NE. $\frac{1}{4}$ of NW. $\frac{1}{4}$ containing 0.06 acre, in sec. 35, T. 9 S., R. 1 E., S. L. B. M.	75.00	Apr. 26, 1915
Butler, David and Zina.....	Improvements on a strip of land in NE. $\frac{1}{4}$ of NE. $\frac{1}{4}$ of sec. 29, and SE. $\frac{1}{4}$ of SE. $\frac{1}{4}$ of sec. 20, T. 9 S., R. 2 E., S. L. B. M., 150 feet wide, containing 7.55 acres.	60.50	Dec. 10, 1914
Bylund, Erick O. and Sophie.	A strip of land in S. $\frac{1}{4}$ of NE. $\frac{1}{4}$ of sec. 36, T. 9 S., R. 1 E., S. L. B. M., containing 2.49 acres.	450.00	Mar. 27, 1915
Carson, George C. and Rebecca A.	A strip of land 200 feet wide containing 13.24 acres, also a strip 25 feet wide, containing 0.12 acre, in the N. $\frac{1}{4}$ of the SE. $\frac{1}{4}$ of sec. 14, T. 9 S., R. 2 E., S. L. B. M., improvements.	501.00	Do.
Carter, William F., et al.....	A strip of land 150 feet wide in SW. $\frac{1}{4}$ of NE. of sec. 29, T. 9 S., R. 2 E., S. L. B. M., containing 0.48 acre.	10.00	Mar. 8, 1915
Clark, Edward W. and Augusta W.	A strip of land containing 1.72 acres in NW. $\frac{1}{4}$ of NW. $\frac{1}{4}$ and 2.18 acres in N. $\frac{1}{4}$ of NW. $\frac{1}{4}$ of sec. 35, also 0.60 acre in NW. $\frac{1}{4}$ of NW. $\frac{1}{4}$ of sec. 36, T. 9 S., R. 1 E., S. L. B. M.	450.00	June 7, 1915
Do.....	Improvements on a strip of land in SW. $\frac{1}{4}$ sec. 26, T. 9 S., R. 1 E., S. L. B. M.	40.00	Dec. 14, 1914
Christianson, Lauritz and Thea C.	A strip of land in NE. $\frac{1}{4}$ of NW. $\frac{1}{4}$ of sec. 35, T. 9 S., R. 1 E., S. L. B. M., containing 2.29 acres.	458.00	Mar. 18, 1915
Cushing, Rena G. and Heber.	A strip of land in E. $\frac{1}{4}$ of NW. $\frac{1}{4}$ of sec. 36, T. 9 S., R. 1 E., S. L. B. M., containing 2.12 acres.	318.00	Mar. 26, 1915
Cushing, Samuel R. and Eva Nellie.	A strip of land in NE. $\frac{1}{4}$ of NW. $\frac{1}{4}$ of sec. 35, T. 9 S., R. 1 E., S. L. B. M., containing 1.12 acres.	100.00	May 26, 1915

*Purchases of rights and property—Continued.*

## UTAH, STRAWBERRY VALLEY PROJECT—Continued.

Vendor.	Description.	Consideration.	Date of deed.
Drollinger, Benjamin F. and Ursula.	A strip of land 30 feet wide in SW. $\frac{1}{4}$ of NE. $\frac{1}{4}$ of sec. 12, T. 9 S., R. 1 E., S. L. B. M., containing 0.13 acre.	\$1.00	Apr. 24, 1915
Eckersley, Mary.	A strip of land 150 feet wide in N. $\frac{1}{4}$ of NE. $\frac{1}{4}$ of sec. 35, T. 9 S., R. 1 E., S. L. B. M., containing 1.15 acres.	175.00	Do.
Elmer, Francis M. and Eliza A.	A strip of land 200 feet wide in S. $\frac{1}{4}$ of NE. $\frac{1}{4}$ of sec. 16, T. 9 S., R. 2 E., S. L. B. M., containing 8.53 acres.	170.60	Jan. 2, 1915
Eriandson, Kjersti, et al.	A strip of land 200 feet wide in N. $\frac{1}{4}$ of NW. $\frac{1}{4}$ of sec. 22, T. 9 S., R. 2 E., S. L. B. M., containing 12.90 acres.	774.00	Do.
Fairbanks, David.	A strip of land 100 feet wide in W. $\frac{1}{4}$ of NE. $\frac{1}{4}$ of sec. 23, T. 9 S., R. 1 E., S. L. B. M., containing 1.3 acres.	60.00	June 15, 1915
Flanders, C. and Araminta.	A strip of land in SE. $\frac{1}{4}$ of NE. $\frac{1}{4}$ of sec. 31, T. 9 S., R. 2 E., S. L. B. M., containing 0.007 acre.	5.00	Dec. 11, 1914
Greenhalgh, Hilma C. and Wm. E.	A strip of land in NE. $\frac{1}{4}$ of NE. $\frac{1}{4}$ of sec. 35, T. 9 S., R. 1 E., S. L. B. M., containing 1.15 acres.	138.00	May 26, 1915
Hatch, Reuben J. and Margaret J.	Improvements on right of way across NW. $\frac{1}{4}$ of NW. $\frac{1}{4}$ of sec. 18, T. 9 S., R. 3 E., S. L. B. M.	45.00	
Holladay, Joseph A. and Mary A.	A strip of land 150 feet wide in W. $\frac{1}{4}$ of NE. $\frac{1}{4}$ of sec. 13, T. 9 S., R. 2 E., S. L. B. M., containing 2.67 acres.	200.00	Mar. 16, 1915
Do.	A strip of land 150 feet wide in N. $\frac{1}{4}$ of SE. $\frac{1}{4}$ of sec. 31, T. 9 S., R. 2 E., S. L. B. M., containing 1.6 acres.	25.00	Dec. 16, 1914
Huish, John E. and Annie M.	A strip of land 150 feet wide in SW. $\frac{1}{4}$ of NW. $\frac{1}{4}$ of sec. 21, and SE. $\frac{1}{4}$ of NE. $\frac{1}{4}$ and NE. $\frac{1}{4}$ of SE. $\frac{1}{4}$ of sec. 20, T. 9 S., R. 2 E., S. L. B. M., containing 8.43 acres.	590.00	Feb. 12, 1915
Johnson, Nils and Levinah.	A strip of land in NW. $\frac{1}{4}$ of NW. $\frac{1}{4}$ of sec. 26, T. 9 S., R. 1 E., S. L. B. M., containing 0.85 acre.	145.00	Mar. 8, 1915
Johnson, Lars A.	A strip of land in W. $\frac{1}{4}$ of lot 3 of sec. 31, T. 9 S., R. 2 E., S. L. B. M.	475.00	Apr. 3, 1915
Larson, James and Johanna.	A strip of land in NE. $\frac{1}{4}$ of SE. $\frac{1}{4}$ of sec. 36, T. 9 S., R. 1 E., S. L. B. M., containing 0.63 acre.	60.00	May 4, 1915
Lindstrom, Chas. A. and Hannah C.	A strip of land in SW. $\frac{1}{4}$ of NE. $\frac{1}{4}$ of sec. 36, T. 9 S., R. 1 E., S. L. B. M., containing 0.81 acre.	140.00	Mar. 9, 1915
McBeth, Jas. S. and Diana.	A strip of land in NE. $\frac{1}{4}$ of SE. $\frac{1}{4}$ of sec. 11, T. 9 S., R. 1 E., S. L. B. M., containing 1 acre.	1.00	May 19, 1915
Moore, Clara Huish and Samuel D.	A strip of land 150 feet wide in NE. $\frac{1}{4}$ of NW. $\frac{1}{4}$ of sec. 21, T. 9 S., R. 2 E., S. L. B. M., containing 1.66 acres.	66.40	Dec. 12, 1914
Ockander, Catharine C.	A strip of land in NE. $\frac{1}{4}$ of SE. $\frac{1}{4}$ of sec. 36, T. 9 S., R. 1 E., S. L. B. M., containing 1.56 acres.	240.00	Apr. 2, 1915
Olsen, Olaf G. and Bernetta A.	A strip of land 150 feet wide in NE. $\frac{1}{4}$ of SW. $\frac{1}{4}$ of sec. 31, T. 9 S., R. 2 E., S. L. B. M., containing 5.44 acres.	435.00	Mar. 3, 1915
Olsen, Andrew.	A strip of land in NW. $\frac{1}{4}$ of NE. $\frac{1}{4}$ of sec. 35, T. 9 S., R. 1 E., S. L. B. M., containing 0.89 acre.	125.00	Do.
Openshaw, John T. and Annie.	A strip of land containing 1.42 acres in N. $\frac{1}{4}$ of NW. $\frac{1}{4}$ of sec. 36, also a strip containing 0.82 acre in NW. $\frac{1}{4}$ of NW. $\frac{1}{4}$ of sec. 25, T. 9 S., R. 1 E., S. L. B. M.	275.00	Mar. 8, 1915
Openshaw, Henry and Ivie.	A strip of land 150 feet wide in SE. $\frac{1}{4}$ of SW. $\frac{1}{4}$ of sec. 29, T. 9 S., R. 2 E., S. L. B. M., containing 0.29 acre.	10.00	May 15, 1915
Page, Jonathan S. and Lilyus C.	A part of block 3, plat Q, of Payson City, containing 0.54 acre; also 2.41 acres in E. $\frac{1}{4}$ of SW. $\frac{1}{4}$ ; also 1.33 acres in SE. $\frac{1}{4}$ of SW. $\frac{1}{4}$ of sec. 16, T. 9 S., R. 2 E., S. L. B. M.	549.00	Dec. 12, 1914
Payson City.	A strip of land situated in lots 2, 3, and 6 of block 9, plat Q, and lots 2, 3, and 6 of block 4 of plat Q, of Payson City: total area, 6.19 acres.	139.28	Aug. 26, 1914
Peterson, Andrew and Emma K.	Improvements on a strip of land 200 feet wide in N. $\frac{1}{4}$ of SE. $\frac{1}{4}$ of NW. $\frac{1}{4}$ of sec. 13, T. 9 S., R. 2 E., S. L. B. M., containing 4.14 acres.	72.45	Nov. 10, 1914
Peterson, Lewis F. and Dora.	A strip of land in NW. $\frac{1}{4}$ of NW. $\frac{1}{4}$ of sec. 36, T. 9 S., R. 1 E., S. L. B. M., containing 0.49 acre.	45.00	May 31, 1915
Peterson, Thomas and Sigred I.	A strip of land in NE. $\frac{1}{4}$ of NE. $\frac{1}{4}$ of sec. 35, T. 9 S., R. 1 E., S. L. B. M., containing 1.15 acres.	138.00	Do.
Peterson, Peter A. and Mary.	A strip of land in NW. $\frac{1}{4}$ of NW. $\frac{1}{4}$ of sec. 36, T. 9 S., R. 1 E., S. L. B. M., containing 0.56 acre.	50.00	Apr. 8, 1915
Petterson, Louis and Begnta.	A strip of land in SE. $\frac{1}{4}$ of NE. $\frac{1}{4}$ of sec. 36, T. 9 S., R. 1 E., S. L. B. M., containing 1.56 acres.	187.00	May 10, 1915
Samuelson, August and Emma.	Strip of land in N. $\frac{1}{4}$ of NW. $\frac{1}{4}$ of sec. 36, T. 9 S., R. 1 E., S. L. B. M., containing 0.05 acre.	7.50	May 8, 1915
Schramm, Elizabeth Dolter, et al.	A strip of land in SE. $\frac{1}{4}$ of SW. $\frac{1}{4}$ of sec. 14, T. 9 S., R. 2 E., S. L. B. M., containing 1.62 acres.	72.90	Apr. 9, 1915

*Purchases of rights and property—Continued.*

## UTAH, STRAWBERRY VALLEY PROJECT—Continued.

Vendor.	Description.	Consideration.	Date of deed.
Spahnower, Joseph A. and Mins.	A strip of land 150 feet wide in SE. $\frac{1}{4}$ of SW. $\frac{1}{4}$ of sec. 29, T. 9 S., R. 2 E., S. L. B. M., containing 3.54 acres.	\$100.00	May 22, 1915
Spahnower, Wm. H. and Matilda E.	A strip of land 150 feet wide in SW. $\frac{1}{4}$ of sec. 29, T. 9 S., R. 2 E., S. L. B. M., containing 2.16 acres.	100.00	Mar. 18, 1915
Stahell, George and Agnes....	A strip of land in NW. $\frac{1}{4}$ of SE. $\frac{1}{4}$ of sec. 16, T. 9 S., R. 2 E., S. L. B. M., containing 1.66 acres.	33.20	Jan. 18, 1915
Do.....	A strip of land 200 feet wide in SE. $\frac{1}{4}$ of SE. $\frac{1}{4}$ of sec. 18, and N. $\frac{1}{4}$ of SE. $\frac{1}{4}$ of sec. 16, T. 9 S., R. 2 E., S. L. B. M., containing 13.77 acres.	298.80	Do.
Stark, Joseph D. and Margaret A.	Improvements on a strip of land 150 feet wide in SE. $\frac{1}{4}$ of SE. $\frac{1}{4}$ of sec. 20, T. 9 S., R. 2 E., S. L. B. M., containing 1.62 acres.	44.55	Dec. 26, 1914
Stevens, Edward E. and Mary E.	A strip of land 150 feet wide in NW. $\frac{1}{4}$ of NW. $\frac{1}{4}$ of sec. 21, T. 9 S., R. 2 E., S. L. B. M., containing 6.08 acres.	360.00	Mar. 10, 1915
Do.....	A strip of land in SE. $\frac{1}{4}$ of NE. $\frac{1}{4}$ of sec. 20, T. 9 S., R. 2 E., S. L. B. M., containing 0.015 acre.	1.00	Aug. 25, 1914
Stone, Joseph A. and Mary J..	A strip of land in SE. $\frac{1}{4}$ of SW. $\frac{1}{4}$ of sec. 7, T. 9 S., R. 3 E., S. L. B. M., 8.79 acres; improvements.	10.00	Nov. 10, 1914
Taylor, Jesse S. and Jane W..	A strip of land 150 feet wide in NE. $\frac{1}{4}$ of NE. $\frac{1}{4}$ of sec. 29, T. 9 S., R. 2 E., S. L. B. M., containing 1.4 acres; improvements.	14.00	Dec. 10, 1914
Taylor, Samuel E. and Minnie A.	Improvements on a strip of land in SE. $\frac{1}{4}$ of SE. $\frac{1}{4}$ of sec. 20, T. 9 S., R. 2 E., S. L. B. M., containing 0.22 acre.	4.00	
Do.....	A strip of land in NE. $\frac{1}{4}$ of SE. $\frac{1}{4}$ of sec. 20, T. 9 S., R. 2 E., S. L. B. M., 1.43 acres.	86.00	Mar. 15, 1915
Taylor, William.....	A strip of land in NW. $\frac{1}{4}$ of NE. $\frac{1}{4}$ of sec. 35, T. 9 S., R. 1 E., S. L. B. M., 2.31 acres.	245.00	May 31, 1915

## WASHINGTON, OKANOGAN PROJECT.

Peters, George.....	Easement for right of way for transmission line across SE. $\frac{1}{4}$ NE. $\frac{1}{4}$ sec. 27, T. 34 N., R. 26 E., W. M.	\$1.00	Aug. 21, 1914
Albertson, W. J., and wife ....	Easement for right of way for transmission line and power station across NW. $\frac{1}{4}$ S. $\frac{1}{4}$ NW. $\frac{1}{4}$ sec. 26, T. 34 N., R. 26 E., W. M.	1.00	Do.
George, Theresa N., and husband.	Easement for right of way for transmission line across NW. $\frac{1}{4}$ SW. $\frac{1}{4}$ sec. 26, T. 34 N., R. 26 E., W. M.	1.00	Sept. 1, 1914
Fitzpatrick, Mrs. Bertha.....	Easement for right of way for transmission line across E. $\frac{1}{4}$ SW. $\frac{1}{4}$ sec. 28, T. 34 N., R. 26 E., W. M.	1.00	Sept. 4, 1914
Robinson, Barton, and wife...	Part of lot 1, sec. 26, T. 34 N., R. 26 E., W. M., 0.15 acre.	1.00	Aug. 31, 1914
Dickson, W. H., and wife.....	West half lot 12—A. Dickson's subdivision of Government lot 1 of sec. 25, T. 34 N., R. 26 E., W. M., 0.13 acre.	1.00	Do.

## WASHINGTON, YAKIMA PROJECT.

Starr, Geo. B., and wife.....	Payment for improvements on land in W. $\frac{1}{4}$ SW. $\frac{1}{4}$ SE. $\frac{1}{4}$ sec. 36, T. 9 N., R. 23 E., W. M.	\$35.00	Oct. 31, 1914
Hulbert, M. Clo.....	Irregular strip, Sunnyside Main Canal, in W. $\frac{1}{4}$ NE. $\frac{1}{4}$ NW. $\frac{1}{4}$ and N. $\frac{1}{4}$ S. $\frac{1}{4}$ SW. $\frac{1}{4}$ NW. $\frac{1}{4}$ sec. 15, T. 9 N., R. 23 E., W. M.	135.00	Nov. 10, 1914
Todd, G. A., and wife.....	Payment for improvements on land in E. $\frac{1}{4}$ NW. $\frac{1}{4}$ NW. $\frac{1}{4}$ sec. 1, T. 8 N., R. 23 E., W. M.	100.00	Nov. 20, 1914
Kunz, Andrew E.....	Defining right of way, Sunnyside Main Canal, over S. $\frac{1}{4}$ E. $\frac{1}{4}$ and N. $\frac{1}{4}$ SE. $\frac{1}{4}$ and SE. $\frac{1}{4}$ SE. $\frac{1}{4}$ sec. 6, T. 11 N., R. 20 E., W. M.	308.75	May 13, 1915

## WYOMING, SHOSHONE PROJECT.

Hutsonpiller, Brady E.....	4.83 acres in NE. $\frac{1}{4}$ NE. $\frac{1}{4}$ sec. 27, T. 52 N., R. 103 W., sixth principal meridian.	\$889.35	July 10, 1914
Nelson, Hans, and Bessie, his wife.	W. $\frac{1}{4}$ NW. $\frac{1}{4}$ sec. 30, T. 52 N., R. 102 W., original Government survey; also described as W. $\frac{1}{4}$ NW. $\frac{1}{4}$ of lot 44, T. 52 N., Rs. 102 and 103 W., resurvey plat of said township.	7,780.00	Feb., 1915

**PRINCIPAL CURRENT CONTRACTS.**

In the following tables are shown, by projects, data relative to the principal contracts in operation or completed during the fiscal year ending June 30, 1915:

*Principal current contracts.***ARIZONA, SALT RIVER PROJECT.**

No.	Date.	Contractor.	Description.	Estimated value.	Estimated earnings, June 30, 1915.	Completion due.
576	Aug. 3, 1914	Manning, Maxwell & Moore.	Traveling crane for power plant.	\$3,956.00	<sup>1</sup> \$3,956.00	Oct. 27, 1914
	Aug. 7, 1914	General Electric Co.	Generator for power plant.	21,694.00	16,059.25	Mar. 7, 1915
571	Aug. 15, 1914	S. Morgan Smith Co.	Turbine water wheel.	18,185.00	<sup>1</sup> 18,185.00	Mar. 1, 1915
577	Sept. 3, 1914	Byron Jackson Iron-works.	Pump for McQueen well.	1,200.00	<sup>1</sup> 1,144.17	Oct. 30, 1914
582	Sept. 25, 1914	S. J. Rhodes.....	Earthwork and structures, Wallace feeder.	14,132.35	12,892.51	Jan. 8, 1915
583	Sept. 24, 1914	Martin & Gillis.....	Earthwork, C a v e Creek Cut-off.	15,648.80	<sup>1</sup> 15,424.95	Dec. 8, 1914
589	Sept. 21, 1914	Maney Bros. & Co...	Structures, C a v e Creek cut-off.	2,956.00	<sup>1</sup> 4,085.20	Jan. 15, 1914
607	Nov. 4, 1914	Westinghouse Electric and Manufacturing Co.	Electrical apparatus for McQueen well.	560.00	<sup>1</sup> 560.00	Dec. 26, 1914
	Dec. 30, 1914	Martin & Gillis.....	Structures, Arizona Canal.	6,908.15	<sup>1</sup> 7,536.20	Jan. 31, 1915
	Jan. 22, 1915	Llewellyn Iron-Works.	Bronze linings for sluicing tunnel.	4,731.00	<sup>1</sup> 4,906.80	Feb. 13, 1915
	Feb. 25, 1915	Baker Ironworks....	Gates.....	2,441.00	2,196.96	Apr. 1, 1915
	Mar. 2, 1915	Pelton Water Wheel Co.	Bronze slide gates for sluicing tunnel.	6,600.00	<sup>1</sup> 6,640.88	Apr. 13, 1915
	Mar. 4, 1915	Advance Machine Co	Gates.....	539.88	475.89	Mar. 15, 1915

**CALIFORNIA, ORLAND PROJECT.**

518	Nov. 18, 1913	Phillip Schuyler .....	Earthwork, East Park Feed Canal.	\$53,130.00	<sup>1</sup> \$68,278.51	Nov. 16, 1914
546	May 29, 1914	M. Fisher .....	Diversion dam and structures, E a s t Park Feed Canal.	46,388.20	<sup>1</sup> 61,465.98	Jan. 19, 1915
561	June 12, 1914	W. H. Mason .....	Earthwork, distribution system.	19,922.50	<sup>1</sup> 19,382.17	Dec. 1, 1914

**COLORADO, GRAND VALLEY PROJECT.**

500	June 28, 1913	Reynolds-Ely Construction Co.	Earthwork, Canyon division, Main Canal.	\$109,568.00	<sup>1</sup> \$111,899.30	Sept. 30, 1914
557	July 6, 1914	Winston Bros. Co...	Earthwork, M a i n Canal, divisions 2, 3, 4.	384,264.50	366,440.77	Sept. 1, 1915
580	Sept. 3, 1914	R. Hardesty Manufacturing Co.	Corrugated metal culverts.	7,031.72	<sup>1</sup> 7,031.72	Sept. 26, 1914
592	Nov. 13, 1914	Thorn & Whiting...	Earthwork, M a i n Canal.	9,180.00	<sup>1</sup> 7,153.05	Feb. 28, 1915
595	Nov. 27, 1914	Ritter-Conley Manufacturing Co.	Rolling crest for diversion dam.	14,280.00	<sup>1</sup> 15,641.01	Apr. 7, 1914
605	Dec. 30, 1914	Minneapolis Steel & Machinery Co.	Hoists for rollers.....	4,950.00	.....	Feb. 17, 1915
612	Jan. 20, 1915	Link-Belt Co.....	Hoist for roller.....	1,600.00	<sup>1</sup> 1,260.00	Mar. 12, 1915
628	Apr. 3, 1915	Reynolds-Ely Construction Co.	Earthwork, Main Canal, division 4.	38,675.00	23,135.53	Sept. 1, 1915
630	Apr. 3, 1915	Mendenhall, Straw, Bird & Co.	Earthwork, Main Canal, division 4 and laterals.	59,921.00	32,405.90	.....do.....

<sup>1</sup> Completed.

*Principal current contracts—Continued.*

COLORADO, UNCOMPAHGRE VALLEY PROJECT.

No.	Date.	Contractor.	Description.	Estimated value.	Estimated earnings, June 30, 1914.	Completion due.
568	Aug. 7, 1914	Maurice A. Wogan..	Selig Canal and upper Selig extension.	\$36,964.00	\$30,685.13	Dec. 31, 1914
573	Aug. 29, 1914	Pacific Tank & Pipe Co.	Garnet Mesa siphon pipe.	11,213.60	11,303.60	Dec. 1, 1914
578	Sept. 4, 1914	Reynolds-Ely Construction Co.	Cade and Union laterals.	34,712.00	30,513.87	Feb. 28, 1915
	Sept. 10, 1914	do.	Garnet Mesa siphon trench.	3,112.00	3,798.27	Oct. 15, 1914
	Nov. 21, 1914	K. E. Orme.....	Orchard Mesa lateral, schedule 1.	1,778.50	2,187.50	Mar. 30, 1915
	Dec. 8, 1914	Orman Construction Co.	Orchard Mesa lateral, schedule 2.	1,932.00	1,927.08	Feb. 28, 1915
	Dec. 14, 1914	W. Harvey Smith...	East Canal waste ditch.	988.50	1,881.07	Mar. 30, 1915
	Jan. 27, 1915	Portland Wood Pipe Co.	Wood stave pipe.....	1,345.36	1,314.59	Apr. 2, 1915
	Jan. 30, 1915	Orman Construction Co.	Upper Selig extension, lateral No. 3.	2,945.00	2,476.58	May 1, 1915
613	Feb. 5, 1915	Reynolds-Ely Construction Co.	Lower Selig extension canal and laterals.	21,765.75	20,550.75	June 1, 1915
614	Feb. 6, 1915	Geo. F. & R. E. Wear.	do.	2,371.50	1,859.31	Do.
	Feb. 12, 1915	E. E. Goddard.....	Orchard Mesa siphon blow-off trench.	513.00	1,484.62	Mar. 1, 1915
	Feb. 20, 1915	Pueblo Bridge Co...	Plate girder bridge spans.	2,670.00	2,704.13	May 17, 1915

IDAHO, BOISE PROJECT.

	Feb. 10, 1914	Inland Steel Co. ....	Steel reinforcement bars.	\$6,370.00	\$6,197.76	Apr. 1, 1914
548	June 5, 1914	Joshua Handy Ironworks.	Balanced valves.....	64,317.00	62,065.90	June 15, 1915
	Sept. 1, 1914	John Brookshier ...	Wasteway excavation.	261.00	206.87	Nov. 1, 1914
	Sept. 9, 1914	Bradbury & Grass	do.	1,328.00	1,919.05	Do.
587	Oct. 12, 1914	Midland Bridge Co.	Highway bridge.....	2,000.00	1,845.00	Dec. 13, 1914
	Nov. 25, 1914	Crane Co. ....	Balanced valves.....	872.00	872.00	Mar. 25, 1915
	Nov. 30, 1914	Union Ironworks Co.	Ejector valves.....	600.00	530.00	May 15, 1915
616	Mar. 1, 1915	Independent Bridge Co.	Movable crest, spillway, Arrowrock Dam.	6,976.36	6,609.32	May 31, 1915
619	Mar. 10, 1915	Western Pipe & Steel Co. of California.	Movable crest for spillway, Arrowrock Dam.	6,370.10	6,369.39	June. 1, 1915
620	Mar. 6, 1915	Chicago Bridge & Iron Co.	do.	7,230.00	.....	June 28, 1915
	Mar. 19, 1915	H. W. Caldwell & Son Co. (Inc.)	Repairs for movable crest.	1,120.00	1,120.00	May 1, 1915

IDAHO, MINIDOKA PROJECT.

573	Aug. 22, 1914	Security Bridge Co..	Highway bridge.....	\$36,478.90	\$26,492.87	June 30, 1915
	Nov. 30, 1914	Seattle Construction & Dry Dock Co.	Pump impellers.....	1,493.00	1,446.28	Feb. 1, 1915
609	Jan. 21, 1915	Brown Holsting Machinery Co.	Portable gasoline dredge.	8,550.00	8,550.00	May 16, 1915
	Feb. 9, 1915	Byron Jackson Ironworks.	Pumps for Boersch Lake.	2,100.00	2,100.00	Apr. 30, 1915
	Feb. 16, 1915	General Electric Co.	Motors.....	3,942.00	3,942.00	Apr. 27, 1915
	Feb. 26, 1915	Pittsburgh Transformer Co.	Transformers.....	946.37	946.37	Apr. 19, 1915

<sup>1</sup> Completed.



*Principal current contracts—Continued.*

## MONTANA, FLATHEAD (INDIAN) PROJECT.

No.	Date.	Contractor.	Description.	Estimated value.	Estimated earnings, Jun 30, 1914.	Completion due.
517	Nov. 3, 1913	Wilson Bros.....	Pablo canals and laterals.	\$33,231.00	\$32,134.26	Apr. 30, 1915
540	Apr. 22, 1914	Hess Flume Co.....	Metal flumes.....	11,307.50	\$10,462.11	May 15, 1914
541	Apr. 18, 1914	Nelson Rich.....	Earthwork and tunnel.	13,950.00	\$10,618.58	July 22, 1914
585	Oct. 6, 1914	Hinman Hydraulic Manufacturing Co.	Gates and gate stands.	1,728.75	\$1,728.75	Feb. 19, 1915
634	Mar. 22, 1915	A. L. Markhus.....	Pablo canals, lateral A, and sublaterals.	16,570.00	13,276.81	July 20, 1915

## MONTANA, HUNTLEY PROJECT.

569	July 31, 1914	E. Lindstrom.....	Construction of tile drain No. 17.	\$11,168.50	\$16,119.51	Jan. 14, 1915
570	.....do.....	Nowell-Atherly Co..	Construction of tile drain No. 5-1.	8,245.00	\$8,500.46	Jan. 16, 1915

## MONTANA, MILK RIVER PROJECT.

509	Aug. 30, 1913	Heuser & Sim.....	Earthwork and structures, Dodson North Canal.	\$66,444.60	\$71,862.59	Oct. 1, 1914
524	Dec. 15, 1913	Threet Bros. & Jolley.	Earthwork and structures, Vandalia South Canal.	42,120.95	\$57,701.37	Apr. 30, 1915
525	Dec. 20, 1913	Tebbs, Taggart, Jurgens & Knipe.	Earthwork, Vandalia South Canal.	74,093.80	\$43,112.86	Nov. 30, 1914
540	Apr. 22, 1914	Hess Flume Co.....	Metal flumes.....	2,504.92	\$2,354.92	June 4, 1914
549	June 8, 1914	James O'Connor.....	Earthwork, Vandalia diversion.	25,220.00	\$24,462.85	Dec. 15, 1914
551	June 27, 1914	Threet Bros. & Jolley.	Earthwork and structures, Vandalia diversion.	13,850.75	\$13,528.38	May 31, 1915
553	June 23, 1914	W. J. Hoy Co.....	Earthwork and structures, Vandalia Point.	42,641.10	45,355.70	July 10, 1915
562	July 22, 1914	Temple & Storky....	Earthwork, Dodson South Canal.	15,738.00	\$16,206.98	May 31, 1915
563	July 23, 1914	Security Bridge Co..	Structures, Dodson South Canal.	48,934.85	57,050.17	July 28, 1915
564	July 27, 1914	Hess Flume Co.....	Metal flumes.....	5,024.48	\$5,024.48	Sept. 25, 1914
566	July 7, 1914	Tebbs, Taggart, Jurgens & Knipe.	Earthwork and structures, Vandalia South Canal.	19,408.00	\$16,931.50	Nov. 30, 1914
585	Oct. 6, 1914	Hinman Hydraulic Manufacturing Co.	Gates and stands.....	2,715.06	\$4,868.04	Feb. 19, 1915
586	Oct. 5, 1914	Minneapolis Steel & Machinery Co.	Iron gates.....	2,444.50	\$2,444.50	Jan. 3, 1915
594	Nov. 20, 1914	Security Bridge Co..	Earthwork and structures, Nelson Reservoir.	28,459.90	19,487.68	Aug. 31, 1915
596	Nov. 25, 1914	.....do.....	Structures, Dodson South Canal.	3,060.00	\$3,746.25	Apr. 30, 1915
603	Dec. 1, 1914	James O'Connor.....	Earthwork, Dodson South Canal.	33,895.00	33,123.73	June 30, 1915
618	Mar. 12, 1915	Minneapolis Bridge Co.	Highway and pipe bridge.	6,528.40	.....	Do.
641	June 14, 1915	James O'Connor.....	Earthwork, Nelson Reservoir, South Canal.	15,615.00	3,288.00	Sept. 15, 1915

## MONTANA, MILK RIVER PROJECT, ST. MARY STORAGE UNIT.

504	July 12, 1913	Adelbert Cazler.....	Earthwork, schedule 4	\$104,030.00	\$105,995.00	Sept. 30, 1915
510	Aug. 5, 1913	J. E. Hilton.....	Earthwork, schedules 1 and 3.	180,080.00	189,577.00	Do.
540	Apr. 22, 1914	Hess Flume Co.....	Flume.....	3,721.00	\$3,580.10	May 25, 1914

1 Completed.

*Principal current contracts—Continued.*

MONTANA, MILK RIVER PROJECT, ST. MARY STORAGE UNIT—Continued.

No.	Date.	Contractor.	Description.	Estimated value.	Estimated earnings, June 30, 1914.	Completion due.
544	May 27, 1914	Midwest Engineering Co.	Schedules 8-10, 12-19, 22.	91,854.83	\$81,751.00	Oct. 31, 1915
547	.....do.....	Condon & Williams..	Schedules 20 and 21....	67,540.00	38,902.75	Do.
558	June 27, 1914	.....do.....	Schedules 2a, 5, 7, and 11.	159,489.90	113,294.00	Do.
567	June 13, 1914	James Brown.....	Highway bridges.....	5,125.75	\$ 5,702.67	Do.
579	Sept. 9, 1914	Chicago Bridge & Ironworks.	St. Mary and Hall's Coulee pressure pipe.	78,900.00	34,731.91	Sept. 15, 1915
585	Oct. 6, 1914	Hinman Hydraulic Manufacturing Co.	Gates and stands.....	1,654.00	\$ 1,219.78	Jan. 20, 1915
586	Oct. 5, 1914	Minneapolis Steel & Machinery Co.	Gates and frames.....	4,480.00	\$ 4,480.00	Dec. 27, 1914
618	Mar. 12, 1915	Minneapolis Bridge Co.	Highway and pipe bridge.	6,528.40	6,200.00	June 30, 1915
	Aug. 29, 1914	Hufaker & Weber..	Logging and sawing..	11,589.39	\$ 11,589.39	Mar. 29, 1915
	Apr. 3, 1915	W. M. Williams.....	Pipe trenches.....	2,788.00	2,232.86	July 10, 1915
	Apr. 16, 1915	L. Thompson.....	Concrete piers.....	3,566.50	2,182.80	July 12, 1915

MONTANA, SUN RIVER PROJECT.

511	Sept. 17, 1913	MacArthur Bros. Co.	Pishkun Reservoir supply and Sun River Slope Canal and tunnels.	\$858,615.00	\$778,671.95	Aug. 1, 1916
531	Feb. 10, 1914	Inland Steel Co.....	Steel reinforcement bars.	4,177.30	\$ 4,081.88	Apr. 1, 1914
532	Jan. 26, 1914	Hayden Bros.....	Structures, Pishkun Reservoir Supply and Sun River Slope Canal.	242,975.50	174,320.17	Oct. 30, 1915
	Feb. 19, 1913	Great Falls Power Co.	Power.....	60,000.00	14,534.47	Sept. 30, 1919
585	Oct. 6, 1914	Hinman Hydraulic Manufacturing Co.	Gates and gate stands..	3,580.90	\$ 3,237.85	Feb. 19, 1915
586	Oct. 5, 1914	Minneapolis Steel & Machinery Co.	Gates and gate frames.	2,067.00	\$ 2,067.00	Dec. 27, 1914
610	Jan. 19, 1915	Bates & Rogers Construction Co.	Pishkun Reservoir Supply Canal.	39,939.50	17,880.09	Aug. 15, 1915
615	Feb. 2, 1915	O'Connor & Helean.	Greenhills distribution system.	43,691.46	25,684.43	Sept. 15, 1915

NEBRASKA-WYOMING, NORTH PLATTE PROJECT.

449	May 24, 1912	Bartlett & Kling....	Dam No. 3.....	\$348,047.00	\$397,759.41	June 26, 1915
	Mar. 31, 1914	Fred Larsen.....	Schedules 24 and 26, Low Line Canal.	1,087.50	\$ 2,228.74	Sept. 1, 1914
	.....do.....	Earl Wildman.....	Schedule 25, Low Line Canal.	893.00	\$ 967.54	Do.
	May 25, 1914	W. C. Broadbent....	Schedules 28 and 29, Low Line Canal; schedules 1 and 2, Low Line laterals.	3,832.50	\$ 3,836.10	Do.
	Oct. 29, 1913	Cadwall & Hough...	Schedules 10 and 13, Low Line laterals.	3,605.50	\$ 3,752.86	July 28, 1914
	June 22, 1914	G. J. Carpenter.....	Schedules 27 and 31, Low Line Canal.	2,784.00	\$ 2,786.95	Sept. 15, 1914
	June 24, 1914	J. L. Selby.....	Schedule 30, Low Line Canal.	1,298.90	\$ 1,277.59	Do.
	Aug. 22, 1914	A. E. Stewart, jr....	Schedule 3, Low Line laterals.	1,317.30	\$ 1,467.31	Nov. 30, 1914
	Aug. 24, 1914	C. J. Cadwall.....	Schedule 33, Low Line Canal.	1,237.64	\$ 1,364.75	Do.
	.....do.....	Larsen & Wildman.	Schedule 32, Low Line Canal.	1,125.00	\$ 1,253.52	Do.
	.....do.....	Krauss & Krauss....	Schedule 4, Low Line laterals.	1,337.32	\$ 1,538.48	Nov. 1, 1914
	Sept. 19, 1914	Ira M. Hewitt.....	Schedule 34, Low Line Canal.	1,310.40	\$ 1,258.77	Dec. 15, 1914
	.....do.....	J. L. Selby.....	Schedule 6, Low Line laterals.	687.60	\$ 691.62	Do.

<sup>1</sup> Suspended; being completed by Government forces.

<sup>2</sup> Completed.

*Principal current contracts—Continued.*

## NEBRASKA-WYOMING, NORTH PLATTE PROJECT—Continued.

No.	Date.	Contractor.	Description.	Estimated value.	Estimated earnings, June 30, 1914.	Completion due.
	July 17, 1914	N. M. Stephenson...	Schedules 18, 19, and 20, Low Line Canal and drain lateral.	\$5,473.50	125,746.62	May 15, 1915
	Aug. 7, 1914	W. L. Townsend & Son.	Schedules 21, 22, and 23, Low Line canal.	5,625.00	16,384.58	Jan. 6, 1915
	Nov. 2, 1914	E. R. Hisey.....	Gatekeeper's house, Whalen Dam.	355.00	1355.00	Jan. 5, 1915
	Dec. 2, 1914	M. C. Morgan.....	Furnishing and delivering sand and gravel.	805.00	1359.00	Feb. 15, 1915
	Dec. 7, 1914	W. S. Moore.....	Excavating drain ditch	1,400.00	11,176.00	May 1, 1915
	May 8, 1915	Wm. Smith.....	Lateral extensions, schedule 3.	120.00	1124.40	June 30, 1915
	.....do.....	Fred C. Krauss.....	Lateral extensions, schedule 2.	472.50	1554.81	Do.
	May 10, 1915	John W. Winchel...	Lateral extensions, schedule 1.	350.00	1350.35	Do.
	May 22, 1915	Carl G. Krauss.....	Lateral extensions, schedule 6.	262.00	1186.65	Do.
	.....do.....	Jesse Hinds.....	Lateral extensions, schedules 4 and 5.	454.50	1436.22	Do.

## NEW MEXICO-TEXAS, RIO GRANDE PROJECT, ELEPHANT BUTTE STORAGE.

	Feb. 20, 1911	Mountain States Telegraph and Telephone Co.	Telephone service.....	\$9,000.00	\$7,215.73	Feb. 20, 1916
506	Aug. 1, 1913	Hinman Hydraulic Manufacturing Co.	Sluice and penstock gates.	47,693.00	155,292.81	Apr. 1, 1915
	Nov. 15, 1913	Darbyshire & Evans.	Coal.....	19,375.00	119,580.00	Nov. , 1914
523	Dec. 19, 1913	Coffin Valve Co.....	Service gates.....	23,248.00	121,844.17	Nov. 11, 1914
527	Jan. 7, 1914	Best Manufacturing Co.	Balanced valves.....	24,980.00	125,848.59	Sept. 15, 1914
	Jan. 8, 1914	Railways Ice Co.....	Ice.....	2,250.00	11,881.00	Mar. , 1915
533	Feb. 7, 1914	R. M. Eddy Foundry Co.	Pipes and castings....	7,942.00	17,831.36	June 24, 1914
	Apr. 25, 1914	Hubbs Laundry Co.	Laundry.....	1,000.00	11,000.00	
	Aug. 1, 1914	West Texas Fuel Co.	Coal.....	1,200.00	903.89	Aug. 1, 1915
	Oct. 28, 1914	Darbyshire & Evans.	.....do.....	27,750.00	16,414.52	Oct. , 1915
	Nov. 25, 1914	H. E. Williams.....	Mules.....	1,000.00	6,358.53	
	Dec. 18, 1914	Railways Ice Co.....	Ice.....	1,800.00	600.30	June 30, 1915
	Mar. 11, 1915	Trump Manufacturing Co.	Hydroelectric machinery.	2,540.00	1,905.00	June 17, 1915
	Mar. 12, 1915	General Electric Co.	.....do.....	1,700.00	1,205.00	Apr. 22, 1915

## OREGON, UMATILLA PROJECT.

552	June 26, 1914	Morrison-Knudsen Co.	Three Mile Falls diversion works.	\$31,865.00	157,281.68	Dec. 31, 1914
	May 20, 1915	Newport Land & Construction Co.	Section 5, Main Canal, west extension.	3,190.00	410.43	July 10, 1915

## OREGON-CALIFORNIA, KLAMATH PROJECT.

	Mar. 9, 1915	Maddox & Lynch...	G Canal, schedules 6, 7, 36, 37, 39, 40, 41.	\$5,076.96	14,907.33	Apr. 28, 1915
	.....do.....	G. L. Walton.....	G Canal, schedule 38..	900.00	1821.75	Do.
	Mar. 10, 1915	W. H. Mason.....	G Canal, schedules 8, 9, 10, 12.	3,700.00	13,229.66	Do.
	Mar. 13, 1915	J. H. Garrett.....	G Canal, schedules 13, 14, 15, 16.	3,601.36	14,674.50	Do.
	Mar. 18, 1915	W. H. Mason.....	G Canal, schedule 11..	650.00	1593.78	Do.

<sup>1</sup> Completed.<sup>2</sup> Per month.

*Principal current contracts—Continued.*

**SOUTH DAKOTA, BELLE FOURCHE PROJECT.**

No.	Date.	Contractor.	Description.	Estimated value.	Estimated earnings, June 30, 1914.	Completion due.
542	May 5, 1914	Owen Construction Co.	Earthwork.....	\$29,718.40	\$31,353.87	Nov. 30, 1914
574	Aug. 27, 1914	Washington Pipe & Foundry Co.	Wood stave pipe.....	4,967.50	4,967.50	Oct. 1, 1914
	Apr. 10, 1915	E. H. Chambers....	Earthwork.....	3,519.25	3,792.42	June 20, 1915

**UTAH, STRAWBERRY VALLEY PROJECT.**

599	Dec. 7, 1914	MacArthur Bros. Co.	High Line Canal, Division 3.	\$37,078.50	\$33,238.71	Sept. 1, 1915
601	Dec. 8, 1914	Mendenhall, Straw & Bird Construction Co.	High Line Canal, division 1.	47,465.00	28,341.70	Do.
602	Dec. 11, 1914	Rideout & Andrus..	High Line Canal, division 2.	25,897.50	23,961.73	Do.
622	Mar. 16, 1915	Wasatch Grading Co.	High Line Canal, division 5.	47,063.62	23,758.98	Do.
624	Mar. 13, 1915	Reynolds-Ely Construction Co.	High Line Canal, division 4.	82,624.75	32,851.92	Do.
629	Mar. 29, 1915	Spanish Fork Grading Co.	High Line Canal, division 6.	22,196.25	5,855.32	Do.
635	May 7, 1915	Green Construction Co.	High Line Canal, division 7.	14,300.00	666.29	Sept. 15, 1915
636	June 9, 1915	Morrison - Knudsen Co.	High Line Canal, division 8.	38,950.35	214.98	Oct. 31, 1915
	May 12, 1915	Lacy Manufacturing Co.	Steel riveted pipe.....	627.00	.....	July 6, 1915

**WASHINGTON, OKANOGAN PROJECT.**

550	June 22, 1914	Pelton Water Wheel Co.	Hydraulic apparatus..	\$6,241.00	\$4,680.75	Oct. 20, 1915
559	July 2, 1914	Allis-Chalmers Manufacturing Co.	.....do.....	6,550.00	3,967.50	Sept. 20, 1914
560	July 1, 1914	General Electric Co.	.....do.....	2,718.55	2,085.01	Oct. 26, 1914
	Aug. 26, 1914	Lacy Manufacturing Co.	Steel pressure pipe.....	1,571.76	1,632.31	Nov. 2, 1914
584	Sept. 21, 1914	American Wood Pipe Co.	Wood stave pipe line..	6,416.00	16,353.33	Apr. 1, 1915
	Nov. 30, 1914	W. A. Kraner & Co..	Erection steel pressure pipe.	1,050.00	1,079.88	May 10, 1915

**WASHINGTON, YAKIMA-SUNNYSIDE PROJECT.**

591	Oct. 17, 1914	J. E. Baker.....	Hauling gravel.....	\$1,650.00	\$1,669.80	Jan. 1, 1915
	Oct. 26, 1914	H. E. Mathieson....	.....do.....	4,641.00	15,378.80	Feb. 1, 1915
	Nov. 2, 1914	G. A. Welber, Jr....	.....do.....	1,890.00	1,837.35	Feb. 4, 1915
	Nov. 10, 1914	Geo. A. Mathieson..	.....do.....	2,312.00	2,615.28	Feb. 15, 1915
	Nov. 11, 1914	Pelton Water Wheel Co.	Hydraulic machinery.	7,967.00	5,900.00	Feb. 10, 1915
600	Nov. 27, 1914	Pacific Tank & Pipe Co.	Wood stave pipe.....	7,263.10	7,285.33	Mar. 21, 1915
	Dec. 1, 1914	David Bros.....	Lateral excavation....	804.50	1,819.11	May 18, 1915
	Dec. 3, 1914	C. M. Mudd.....	.....do.....	1,299.42	1,369.09	May 20, 1915
636	Dec. 28, 1914	Rowan & Anderson.	Canal excavation.....	25,220.00	19,048.62	May 1, 1915
608	Dec. 30, 1914	Washington Pipe & Foundry Co.	Wood stave pipe.....	10,777.95	10,644.30	Apr. 30, 1915
	Feb. 10, 1915	Pacific Tank & Pipe Co.	.....do.....	3,893.59	3,877.52	May 17, 1915
	Feb. 15, 1915	B. Boling.....	Hauling gravel.....	392.30	1,455.30	Mar. 28, 1915
	Mar. 1, 1915	Mathieson & Mudd..	Earth and rockwork.	3,611.25	3,145.21	June 30, 1915
617	Mar. 4, 1915	Pacific Tank & Pipe Co.	Wood stave pipe.....	11,093.73	11,284.85	June 27, 1915
	Mar. 22, 1915	.....do.....	.....do.....	2,633.04	2,748.37	June 22, 1915
	Mar. 23, 1915	S. Morgan Smith Co.	Hydraulic machinery	2,124.00	2,153.00	June 11, 1915
625	Mar. 25, 1915	Char. C. Moore & Co.	.....do.....	10,611.00	.....	July 31, 1915
627	Mar. 26, 1915	Pacific Tank & Pipe Co.	Wood stave pipe.....	11,346.45	11,391.60	June 27, 1915
	Apr. 12, 1915	F. R. Schoenberg....	Canal excavation.....	1,591.80	1,478.80	May 1, 1915

<sup>1</sup> Completed.

*Principal current contracts—Continued.*

## WYOMING, SHOSHONE PROJECT.

No.	Date.	Contractor.	Description.	Estimated value.	Estimated earnings, June 30, 1914.	Completion due.
548	June 5, 1914	Joshua Hendy Iron Works.	Balanced valves.....	\$6,211.00	\$5,735.14	June 15, 1915
593	Nov. 19, 1914	R. M. Lynn.....	Schedules 1, 2, 3, 4, lateral A extension..	4,332.50	8,079.07	June 1, 1915
598	.....do .....	Threest Bros. & Jolley.	Schedule 5, lateral A extension.	9,651.50	11,714.98	Do.

<sup>1</sup> Completed.

## CEMENT.

*Contracts for cement.*

[The table contains data relating to the contracts for cement in operation or completed during the fiscal year ending June 30, 1915.]

No.	Date.	Contractor.	Price per barrel, f. o. b. works.	Estimated number of barrels.	Estimated value.	Estimated earnings, June 30, 1915.	Completion due.
434	Mar. 1, 1912	Riverside Portland Cement Co. . .	\$1.37 <sup>1</sup>	12,000	\$16,500	\$11,468.75	June 30, 1916
463	Nov. 8, 1912	Ogden Portland Cement Co.....	.99	130,000	128,700	150,591.87	Dec. 31, 1915
468	Dec. 5, 1912	Union Portland Cement Co.....	.98	130,000	127,400	152,880.00	Do.
489	Feb. 28, 1913	Three Forks Portland Cement Co.	1.15	50,000	57,500	64,942.30	May 1, 1915
491	Mar. 12, 1913	Standard Portland Cement Corporation.	1.40	30,000	42,000	47,425.40	Do.
534	Mar. 10, 1914	Lehigh Portland Cement Co.....	1.00	13,000	13,000	10,618.30	Do.
535	Mar. 11, 1914	United States Portland Cement Co.	.96	12,000	11,520	13,824.00	Do.
536	Mar. 7, 1914	Inland Portland Cement Co.....	.98	10,000	9,800	11,760.00	Do.
537	Mar. 14, 1914	Dewey Portland Cement Co.....	.82	16,000	13,120	10,640.32	June 30, 1915
545	May 25, 1914	Southwestern Portland Cement Co.	1.40	120,335	168,469	193,485.92	May 1, 1915
554	June 20, 1914	Colorado Portland Cement Co. . .	1.00	45,000	45,000	54,000.00	Do.
555	June 26, 1914	Ogden Portland Cement Co.....	1.33	5,500	7,315	6,856.15	Do.
565	July 5, 1914	Union Portland Cement Co.....	1.33	5,500	7,315	7,315.00	Do.
575	Sept. 3, 1914	.....do.....	1.13	30,000	33,900	42,375.00	Dec. 1, 1914
581	Sept. 28, 1914	Portland Cement Co. of Utah.	1.28	3,000	3,840	4,800.00	June 30, 1915
588	Sept. 8, 1914	International Portland Cement Co.	1.15	10,000	11,500	14,375.00	May 1, 1915
590	Oct. 17, 1914	Western States Portland Cement Co.	.78	4,600	3,558	4,197.50	June 30, 1915
597	Nov. 27, 1914	Colorado Portland Cement Co. . .	1.00	16,000	16,000	20,000.00	Apr. 1, 1915
611	Jan. 20, 1915	Southwestern Portland Cement Co.	1.40	45,000	63,000	66,778.39	June 30, 1915
621	Mar. 12, 1915	Colorado Portland Cement Co. . .	1.00	1,500	1,500	1,875.00	Do.
623	Mar. 20, 1915	International Portland Cement Co.	1.18	10,000	11,800	14,750.00	Do.
626	Mar. 15, 1915	Union Portland Cement Co. . . . .	1.10	24,000	26,400	31,120.10	June 30, 1916
631	Mar. 24, 1915	Three Forks Portland Cement Co.	1.20	11,000	13,200	14,250.00	June 30, 1915
632	Mar. 16, 1915	Pacific Portland Cement Co.....	1.40	1,300	1,820	2,275.00	Do.
633	Mar. 31, 1915	Lehigh Portland Cement Co.....	1.00	6,000	6,000	7,200.00	Do.

<sup>1</sup> Completed.

*Purchases of cement during fiscal year 1915.*

Contract No.:	Barrels.	Contract No.:	Barrels.
434.....	5,300	581.....	3,750
463.....	61,291	588.....	12,500
468.....	59,222	590.....	5,750
489.....	41,676	597.....	20,000
491.....	24,580	611.....	48,042
534.....	1,550	621.....	1,875
535.....	13,900	623.....	12,500
536.....	9,304	626.....	28,291
537.....	12,576	631.....	11,875
545.....	131,998½	632.....	1,625
554.....	16,500	633.....	2,700
555.....	5,155		
565.....	5,500		
575.....	37,500		
		Total.....	574,980½

Tabulation of cement tests from Jan. 1, 1904, to June 30, 1915.

[Average of accepted cement.]

Brand.	Quantity (barrels).	Fineness.		Setting time.		Specific gravity.	Composition of briquets.	Tensile strength.			
		Per cent passing No. 100 sieve.	Per cent passing No. 200 sieve.	Initial.	Final.			1 day.		7 days.	
								Number of briquets.	Pounds per square inch.	Number of briquets.	Pounds per square inch.
Ash Grove.....	30,850	95.6	82.2	3 51	7 25	3.16	Neat.. 3 to 1..	30	361	655	766
Atlas (Hannibal, Mo.) ..	17,690	96.2	78.2	1 45	5 02	3.17	Neat.. 3 to 1..	30	353	655	348
Concrete.....	14,400	98.4	82.9	3 41	6 26	3.13	Neat.. 3 to 1..	30	376	385	603
Cowboy.....	21,395	96.2	76.6	3 09	6 20	3.15	Neat.. 3 to 1..	40	314	379	716
Dewey.....	14,206	96.6	80.1	3 45	6 40	3.15	Neat.. 3 to 1..	15	407	379	818
El Toro.....	289,833	93.1	77.2	3 01	5 31	3.16	Neat.. 3 to 1..	345	353	712	749
Golden Gate.....	223,458	95.7	77.8	3 22	5 49	3.12	Neat.. 3 to 1..	105	314	200	730
Ideal.....	246,181	96.3	80.1	3 45	7 13	3.14	Neat.. 3 to 1..	115	358	4,284	689
Inland, Lehigh (Meta- line Falls, Wash.). <sup>1</sup>	14,700	95.7	79.4	3 43	5 46	3.13	Neat.. 3 to 1..	15	375	4,284	261
Iola.....	164,265	94.0	78.3	3 54	7 58	3.16	Neat.. 3 to 1..	115	364	4,375	688
Lehigh (Mason City, Iowa).	15,335	95.8	79.1	3 35	5 58	3.17	Neat.. 3 to 1..	25	375	4,375	302
Marquette.....	32,155	94.7	77.3	3 18	7 05	3.15	Neat.. 3 to 1..	35	384	478	744
Mount Diablo.....	43,740	95.0	78.8	3 40	6 22	3.13	Neat.. 3 to 1..	30	386	478	325
Ogden.....	203,302	97.0	78.9	4 08	7 27	3.16	Neat.. 3 to 1..	75	311	635	794
Red Devil (Devils Slide, Utah).	280,607	96.5	78.3	3 43	6 25	3.14	Neat.. 3 to 1..	90	380	635	396
Red Devil (Trident, Mont.).	79,962	97.3	82.3	3 38	6 13	3.14	Neat.. 3 to 1..	65	343	635	396
Red Diamond, Utah <sup>2</sup> ..	54,559	96.9	79.7	4 13	7 40	3.15	Neat.. 3 to 1..	80	352	2 3 5	319
Riverside.....	25,850	96.2	80.2	4 48	7 59	3.13	Neat.. 3 to 1..	25	360	2 3 5	319
Spokane.....	26,500	95.5	80.3	3 13	5 55	3.11	Neat.. 3 to 1..	15	388	540	685
Standard (Napa Junc- tion, Cal.).	43,691	97.2	82.2	4 07	6 58	3.11	Neat.. 3 to 1..	45	235	540	685
Sunflower (Independ- ence, Kans.).	7,055	95.8	79.1	2 32	6 32	3.17	Neat.. 3 to 1..	15	422	518	364
Sunflower (Iola, Kans.).	87,975	94.2	78.0	3 30	7 24	3.15	Neat.. 3 to 1..	55	347	692	651
Universal (South Chi- cago, Ill.).	184,100	96.9	81.0	3 24	7 26	3.14	Neat.. 3 to 1..	70	343	792	704
Yankton.....	28,484	96.3	80.4	3 53	8 28	3.21	Neat.. 3 to 1..	85	261	880	879
Total.....	2,150,233	95.7	79.0	3 37	6 45	3.14	Neat.. 3 to 1..	1,550	348	43,501	691
										43,501	263

<sup>1</sup> Made at same plant. Brand name changed from Inland to Lehigh April, 1914.

<sup>2</sup> Made at same plant. Name changed from Red Diamond to Utah June, 1910.

Tabulation of cement tests from Jan. 1, 1904, to June 30, 1915.

[Average of accepted cement.]

Tensile strength.																	
28 days.		3 months.		6 months.		1 year.		2 years.		3 years.		5 years.		7½ years.		10 years.	
Number of briquets.	Pounds per square inch.	Number of briquets.	Pounds per square inch.	Number of briquets.	Pounds per square inch.	Number of briquets.	Pounds per square inch.	Number of briquets.	Pounds per square inch.	Number of briquets.	Pounds per square inch.	Number of briquets.	Pounds per square inch.	Number of briquets.	Pounds per square inch.	Number of briquets.	Pounds per square inch.
655	797	40	770	40	757	40	732	40	759	30	754	10	717				
655	452	40	470	40	459	40	439	40	439	30	432	10	434				
385	667	30	705	30	670	30	689	30	739	30	692	15	679	5	681		
385	358	30	467	30	437	30	439	30	413	30	405	15	412	5	404		
379	756	30	802	20	763	20	756	15	666	15	652	15	671	5			
379	436	30	468	20	444	20	435	15	400	15	406	15	409				
712	871	40	846	30	840	30	810	30	775	30	735	25	719	25	695		
712	396	40	443	30	461	30	448	30	438	30	419	25	423	25	437		
200	789	15	769	10	818	10	771	5	692	5	740	5	754				
200	421	15	450	10	484	10	463	5	420	5	423	5	427				
4,282	795	410	698	260	814	140	820	55	788	45	792	5	823				
4,282	344	410	339	260	420	140	414	55	436	45	446	5	430				
5,939	787	240	762	90	708	80	685	80	687	60	690	20	685				
5,939	341	240	438	90	429	80	406	80	413	60	404	20	424				
4,379	737	120	723	115	725	115	705	105	707	96	696	80	673	45	676	15	638
4,379	402	120	451	115	452	115	464	106	448	95	428	80	427	45	407	15	427
478	789	15	763	15	757	15	779										
478	429	15	410	15	398	15	419										
3,132	842	130	842	125	796	125	791	125	774	115	753	95	721	50	761	10	655
3,132	431	130	451	125	447	125	420	125	413	115	389	95	399	50	395	10	423
404	756	26	757	26	751	20	742	10	756	5	688						
404	433	26	459	26	446	20	426	10	422	5	455						
635	822	85	755	35	737	35	724	35	749	35	704	30	707				
635	402	85	441	35	447	35	446	35	459	35	437	30	427				
433	738	35	759	30	721	30	707	30	693	25	717	5	655				
433	341	35	414	30	431	30	414	30	406	25	404	5	350				
8,799	729	75	760	55	735	45	729	25	701	10	665						
8,799	404	75	450	55	455	45	439	25	453	10	437						
4,719	798	95	791	80	778	70	769	45	774	45	765	25	777	5	770		
4,719	438	95	453	80	459	70	424	45	400	45	415	25	385	5	429		
1,536	740	65	736	50	705	45	686	30	698	20	650						
1,536	444	65	472	50	460	45	450	30	458	20	422						
2,370	711	95	722	85	750	80	762	80	771	70	752	40	701	40	665	10	661
2,370	418	95	469	85	484	80	481	80	446	70	421	40	404	40	412	10	376
540	731	20	734	15	743	15	740	10	730	10	716						
540	401	20	451	15	452	15	445	10	416	10	425						
518	826	15	780	5	691	5	625										
518	441	15	435	5	457	5	469										
713	766	50	732	30	701	20	707	10	577	10	654	10	606				
713	357	50	478	30	494	20	495	10	514	10	506	10	481				
133	927	15	925	15	881	15	824	15	803	15	739	15	782	5	800		
133	504	15	498	15	504	15	470	15	467	15	445	15	450	5	391		
1,242	874	55	820	55	807	55	765	55	765	55	744	45	710	15	740		
1,242	424	55	434	55	424	55	387	55	387	55	373	45	357	15	344		
3,635	803	70	860	70	817	70	799	70	781	70	751	70	745	60	743		
3,635	375	70	420	70	407	70	402	70	372	70	346	70	351	60	354		
945	775	60	791	60	785	60	773	60	748	60	738	60	732	30	758	5	589
945	357	60	433	60	440	60	430	60	414	60	420	60	412	30	410	5	411
42,163	780	1,780	758	1,345	769	1,170	755	960	744	855	732	570	714	280	725	40	642
42,163	395	1,780	421	1,345	443	1,170	432	960	428	855	410	570	402	280	394	40	411

NOTE.—In considering the results of long-time tests, as shown above, it should be borne in mind that while the results for the different periods are approximately comparable they are not directly comparable, as in most cases there is a difference in the number of briquets represented by the results for various periods on the different brands, owing to the fact that new sets are being started from time to time, the results of which become available at different periods.

8004°—15—24



## UNIT BIDS AND CONTRACT PRICES.

*Unit bids and contract prices on formal specifications.*

## BACKFILLING.

State and project.	Date opening bids.	Specification number.	Feature or description.	Unit.	Quantity.	Bids per unit.		Contract price.
						Lowest.	Next.	
Utah, Strawberry Valley.....	Nov. 16, 1914	284	High Line Canal, division 1.....	Cubic yards.....	200	\$0.25	\$0.35	\$1.00
Do.....	do.....	284	High Line Canal, division 2.....	do.....	450	.20	.25	.20
Do.....	do.....	284	High Line Canal, division 3.....	do.....	850	.35	.45	.50
Montana, Sun River.....	July 1, 1915	292	Greenfields District system:	do.....	2,000	.12	.25	.30
Do.....	do.....	292	Schedule 6, structures, laterals, Greenfields and South Canals.....	do.....	3,500	.12	.30	.30
Do.....	do.....	292	Schedule 7, structures, laterals, Sun River Slope Canal.....	do.....	3,450	.12	.30	.35
Do.....	do.....	292	Schedule 8, structures, laterals, Greenfields Canal.....	do.....	3,900	.12	.30	.30
Do.....	do.....	292	Schedule 9, structures, laterals, Greenfields Canal.....	do.....	1,800	.12	.225	.225
Utah, Strawberry Valley.....	Feb. 3, 1915	295	Schedule 10, highway bridges.....	do.....	2,200	.25	.30	.50
Do.....	Feb. 24, 1915	296	High Line Canal, division 4.....	do.....	936	.25	.45	.45
Do.....	Mar. 10, 1915	298	High Line Canal, lateral 30.....	do.....	1,500	.25	.40	.25
Do.....	Apr. 8, 1915	299	High Line Canal, laterals 32 and 33.....	do.....	1,200	.45	.50	.45
Do.....	May 19, 1915	303	High Line Canal, division 7, laterals 1-19.....	do.....	2,500	.40	.45	.45
Do.....	June 16, 1915	305	High Line Canal, division 8, lateral 20.....	do.....	1,800	.50	.50	.50
Do.....	July 16, 1915	306	High Line Canal, division 9, laterals.....	do.....	2,000	.40	.50	.50
Do.....	do.....	306	High Line Canal, division 10, laterals.....	do.....	2,000	.40	.50	.50

## BRIDGE, STEEL HIGHWAY.

Wyoming, Snake River storage.....	July 22, 1914	274	Gros Ventre site:	No.....	3	\$1,040.00	\$1,480.00	.....
Do.....	do.....	274	Item 1, 3-130 foot spans (turnished).	Set.....	3	475.00	636.00	.....
Do.....	do.....	274	Item 2, 3 steel bridge piers (turnished).	.....	.....	1,700.00	1,790.00	.....
Do.....	do.....	274	Item 3 (erection bridge).	.....	.....	4.00	6.00	.....
Do.....	do.....	274	Item 9, erection 3 steel piers.....	Linear feet.....	120	9.00	20.00	.....
Do.....	do.....	274	Item 10, sinking piers.....	do.....	85	.....	.....	.....
Do.....	do.....	274	Jackson site:	No.....	.....	3,120.00	4,445.00	\$4,364.89
Do.....	do.....	274	Item 19, 3-130 spans, through Pratt trusses (turnished).	.....	.....	.....	.....	.....
Do.....	do.....	274	Item 20, 4 steel piers.....	.....	.....	1,900.00	2,545.00	1,970.00
Do.....	do.....	274	Item 21, erection 19 and 20.....	.....	.....	4.00	9.50	1,700.00
Do.....	do.....	274	Item 31, 4 steel piers.....	Linear feet.....	160	.....	.....	4.00
Do.....	do.....	274	Item 32, sinking 4 steel piers.....	do.....	110	9.00	20.00	17.36

Idaho, Boise.....	July 30, 1914	276	Item 1, one 96-foot through span (furnished).....	One.....	1,105.00	1,125.00	1,480.00
Do.....	do.....	276	Item 2, one 96-foot through span, erection.....	do.....	520.00	740.00	1,420.00
Montana, Milk River.....	Oct. 28, 1914	281	Dodson Canal at Dodson bridge, moving bridge.....	Item.....	1,000.00	1,500.00	2,475.00
Do.....	Jan. 12, 1915	291	St. Mary, River crossing (furnished), weight about 200,000 pounds, 2 spans, 99 feet 10 inches each.	Span.....	2	2,475.00	2,475.00
Do.....	do.....	291	Erecting above, including wooden floor.....	do.....	2	726.00	770.00

## CONCRETE.

Wyoming, Snake River storage.....	July 22, 1914	274	Bridge, item 11, in pier shells.....	Cubic yards.....	85	\$8.00	\$11.70
Do.....	do.....	274	Bridge, item 14, in end abutment.....	do.....	115	18.00	24.00
Do.....	do.....	274	Bridge, item 33, in end abutment.....	do.....	115	8.00	11.75
Arizona, Salt River.....	Aug. 17, 1914	278	Cave Creek cutoff, Arizona Canal, reinforced.....	do.....	45	8.00	9.00
Do.....	do.....	278	Cave Creek cutoff, Arizona Canal, plain.....	do.....	215	15.15	16.00
Do.....	Aug. 24, 1914	280	Wallace Feeder Canal, plain.....	do.....	60	10.00	10.25
Do.....	do.....	280	Arizona Canal, structures reinforced.....	do.....	240	12.88	12.88
Do.....	do.....	280	Arizona Canal, abutments and piers.....	do.....	40	10.00	11.50
Montana, Milk River.....	Dec. 30, 1914	281	Nelson Reservoir, schedule 2.....	do.....	900	9.20	9.20
Do.....	Oct. 28, 1914	283	Fishkum Reservoir Supply Canal, conduit, etc.....	do.....	1,600	8.40	8.85
Montana, Sun River.....	Oct. 13, 1914	283	Pishkum Reservoir Supply Canal, bridge piers.....	do.....	1,625	9.20	9.55
Do.....	Dec. 8, 1914	283	High Line Canal, division 1.....	do.....	1,350	3.50	7.00
Do.....	do.....	284	High Line Canal, division 2.....	do.....	1,350	7.75	8.00
Do.....	do.....	284	High Line Canal, division 3.....	do.....	370	11.00	11.00
Do.....	Dec. 22, 1914	288	Pablo lateral, 31A, schedule 1.....	do.....	450	12.00	12.00
Do.....	do.....	288	Pablo lateral, 31A, schedule 2.....	do.....	230	12.00	12.00
Do.....	do.....	288	Pablo lateral, A, schedule 3.....	do.....	230	12.00	12.00
Do.....	July 1, 1915	292	Greenfields distribution system.....	do.....	1,570	8.00	8.00
Montana, Sun River.....	July 1, 1915	292	Schedule 6, laterals, Greenfields and South Canals.....	Cubic yards.....	720	8.00	11.00
Do.....	do.....	292	Schedule 7, laterals, Sun River Slope and Greenfields.....	do.....	800	8.00	8.00
Do.....	July 1, 1915	292	Schedule 8, laterals, Greenfields Canal.....	do.....	810	8.00	8.00
Do.....	July 1, 1915	292	Schedule 9, laterals, Greenfields Canal.....	do.....	325	10.00	10.00
Utah, Strawberry Valley.....	Feb. 3, 1915	295	Schedule 10, Highway bridges.....	do.....	1,250	7.45	7.70
Do.....	Feb. 24, 1915	296	High Line Canal, lateral 40.....	do.....	310	8.00	8.50
Do.....	Mar. 10, 1915	298	High Line Canal, lateral 30.....	do.....	425	6.75	6.75
Do.....	Mar. 10, 1915	298	High Line Canal, lateral 32 and 33.....	do.....	450	8.00	8.00
Do.....	Apr. 30, 1915	300	High Line Canal, division 7, laterals 1-19.....	do.....	115	10.50	10.50
Do.....	Apr. 30, 1915	300	St. Mary Canal, check control.....	do.....	120	control gate	No bids.
Do.....	Apr. 30, 1915	300	St. Mary Canal, sluice gate.....	do.....	240	control gate	No bids.
Do.....	Apr. 30, 1915	300	St. Mary Canal, pipe culverts.....	do.....	30	do.....	No bids.
Do.....	Apr. 30, 1915	300	St. Mary Canal, culvert, station 253.....	do.....	10	do.....	No bids.
Do.....	Apr. 30, 1915	300	St. Mary Canal, culvert, station 253.....	do.....	10	do.....	No bids.
Do.....	May 19, 1915	303	High Line Canal, division 8, lateral 20.....	do.....	900	9.40	9.40
Do.....	June 16, 1915	305	High Line Canal, division 9, laterals.....	do.....	650	11.50	11.50
Do.....	July 15, 1915	306	High Line Canal, division 10, laterals.....	do.....	950	11.00	12.00

1 Lump sum.

Unit bids and contract prices on formal specifications—Continued.  
CONCRETE, CANAL LINING.

State and project.	Date opening bids.	Specification number.	Feature or description.	Unit.	Quantity.	Bids per unit.		Contract price.
						Lowest.	Next.	
Utah, Strawberry Valley.....	Nov. 16, 1914	284	High Line Canal, division 1.....	Square feet.....	11,600	\$0.075	\$0.095	\$0.095
Do.....	Nov. 16, 1914	284	High Line Canal, division 2.....	do.....	1,000	.08	.10	.10
Do.....	Nov. 16, 1914	284	High Line Canal, division 3.....	do.....	155,000	.065	.085	.085
Do.....	Nov. 16, 1914	284	High Line Canal, division 4, 4 inches thick.....	do.....	462,000	.0675	.075	.075
Do.....	Feb. 3, 1915	285	High Line Canal, division 4, 24 inches thick.....	do.....	5,300	.06	.065	.07
Do.....	Feb. 3, 1915	286	High Line Canal, lateral 20, 24 inches thick.....	do.....	436,000	.07	.075	.075
Do.....	Mar. 10, 1915	286	High Line Canal, laterals 32 and 33, 24 inches thick.....	do.....	200,000	.06625	.0675	.0725
Do.....	Mar. 10, 1915	288	High Line Canal, laterals 32 and 33, 1½ inches thick.....	do.....	17,700	.048	.06375	.065
Do.....	Apr. 8, 1915	289	High Line Canal, division 7, laterals 1-19, 24 inches thick.....	do.....	112,000	.067	.075	.067
Do.....	Apr. 8, 1915	289	High Line Canal, division 7, laterals 1-19, 4 inches thick.....	do.....	3,000	.09	.15	.09
Do.....	May 19, 1915	303	High Line Canal, division 8, lateral 20, 24 inches thick.....	do.....	325,000	.065	.07	.065
Do.....	June 16, 1915	305	High Line Canal, division 9, laterals, 24 inches thick.....	do.....	250,000	.075	.085	.075
Do.....	July 15, 1915	306	High Line Canal, division 10, laterals, 24 inches thick.....	do.....	525,000	.08	.10	.08
CRIB WORK.								
Montana, Sun River.....	Dec. 8, 1914	283	Pishkun Reservoir Supply Canal, placing logs.....	Linear feet.....	1,000	\$0.10	\$0.15	\$0.15
Do.....	Dec. 8, 1914	283	Pishkun Reservoir Supply Canal, filling with rock.....	Cubic yards.....	80	.60	1.25	2.00
DRAINS, TILE.								
Montana, Huntley.....	July 31, 1914	193	Excavating, laying tiling, and back filling: Schedule 1, trench, less than 7 feet deep.....	Linear feet.....	550	\$1.10	\$1.16	\$1.16
Do.....	July 31, 1914	193	Schedule 1, trench, 7 to 8 feet deep.....	do.....	450	1.22	1.26	1.26
Do.....	July 31, 1914	193	Schedule 1, trench, 8 to 9 feet deep.....	do.....	4,700	1.34	1.35	1.34
Do.....	July 31, 1914	193	Schedule 2, trench, over 9 feet deep.....	do.....	200	1.45	1.50	1.45
Do.....	July 31, 1914	193	Schedule 2, trench, less than 7 feet deep.....	do.....	260	.84	.85	.85
Do.....	July 31, 1914	193	Schedule 2, trench, 7 to 8 feet deep.....	do.....	900	.90	.94	.90
Do.....	July 31, 1914	193	Schedule 2, trench, 8 to 9 feet deep.....	do.....	6,950	1.08	1.09	1.08
Do.....	July 31, 1914	193	Schedule 2, trench, over 9 feet deep.....	do.....	2,200	1.16	1.20	1.20

**EMBANKMENT, ROLLED.**

Location	Date	Station	Section	Area	Volume	Remarks
Montana, Milk River	Oct. 28, 1914	261	Dodson South Canal at Dodson Branch	Cubic yards	52,000	\$0.19
Utah, Strawberry Valley	Feb. 24, 1915	266	High Line Canal, lateral 30	do	6,429	.10
Do.	Mar. 10, 1915	268	High Line Canal, lateral 32 and 33	do	4,300	.03
Do.	Apr. 8, 1915	269	High Line Canal, division 7, lateral 1-19	do	3,500	.02
Do.	May 18, 1915	303	High Line Canal, division 8, lateral 20	do	12,000	.10
Do.	June 15, 1915	304	High Line Canal, division 9, lateral 21	do	8,000	.10
Do.	July 15, 1915	306	High Line Canal, division 10, lateral 22	do	8,000	.10

**EXCAVATION, CLASS 1 (EARTH).**

[illegible]

*Unit bids and contract prices on formal specifications—Continued.*

## EXCAVATION, CLASS 1 (EARTH)—Continued.

State and project.	Date opening bids.	Specification number.	Feature or description.	Unit.	Quantity.	Bids per unit.		Contract price.
						Lowest.	Next.	
Colorado, Uncompahgre.	Jan. 5, 1915	293	Selig Canal system, schedule 5, lateral No. 4.	Cubic yards.	4,400	\$0.205	\$0.21	\$0.205
Do.	do.	293	Selig Canal system, schedule 6, lateral No. 5.	do.	3,900	.205	.21	.205
Do.	do.	293	Selig Canal system, schedule 7, lateral No. 6.	do.	3,000	.205	.21	.205
Do.	do.	293	Selig Canal system, schedule 8, lateral No. 7, stations 0-50.	do.	6,300	.205	.21	.205
Do.	do.	293	Selig Canal system, schedule 9, lateral No. 7, stations 80-170.	do.	6,300	.205	.21	.205
Do.	do.	293	Selig Canal system, schedule 10, lateral No. 7, stations 170-264.	do.	6,350	.205	.21	.205
Do.	do.	293	Selig Canal system, schedule 11, lateral No. 8.	do.	5,150	.205	.21	.205
Do.	do.	293	Selig Canal system, schedule 12, lateral No. 8A.	do.	4,800	.205	.21	.205
Do.	do.	293	Selig Canal system, schedule 13, lateral No. 9.	do.	3,000	.205	.21	.205
Do.	do.	293	Selig Canal system, schedule 14, lateral No. 10.	do.	2,850	.205	.21	.205
Do.	do.	293	Selig Canal system, schedule 15, lateral No. 11.	do.	3,550	.17	.205	.17
Do.	do.	293	Selig Canal system, schedule 16, Lower Selig extension.	do.	5,550	.205	.21	.205
Do.	do.	293	Selig Canal system, schedule 17, Lower Selig extension.	do.	4,000	.205	.21	.205
Do.	do.	293	Selig Canal system, schedule 18, Lower Selig extension.	do.	5,850	.205	.21	.205
Do.	do.	293	Selig Canal system, schedule 19, Lower Selig extension.	do.	6,500	.17	.205	.17
Utah, Strawberry Valley.	Feb. 3, 1915	295	High Line Canal, division 4.	do.	117,400	.125	.145	.22
Do.	Feb. 24, 1915	296	High Line Canal, lateral 30.	do.	40,625	.145	.18	.145
Colorado, Grand Valley.	Mar. 10, 1915	297	Main Canal, schedule 1, stations 1933-2035.	do.	119,000	.15	.16	.15
Do.	do.	297	Main Canal, schedule 2, stations 2035-2197.	do.	119,300	.14	.15	.14
Do.	do.	297	Main Canal, schedule 3, stations 2197-2317.	do.	78,000	.14	.14	.14
Do.	do.	297	Main Canal, schedule 4, stations 2317-2437.	do.	90,000	.15	.15	.15
Do.	do.	297	Main Canal, schedule 5, laterals 1, 2, 5, 6, 7, 10, 11, 12.	do.	85,000	.135	.14	.135
Do.	do.	297	Main Canal, schedule 6, laterals 14-17, 20, 21, 25, 29.	do.	75,000	.135	.15	.135
Do.	do.	297	Main Canal, schedule 7, laterals 30, 33, 35, 38, 40.	do.	60,000	.135	.15	.135
Do.	do.	297	High Line Canal, laterals 32 and 33.	do.	11,500	.12	.125	.12
Utah, Strawberry Valley.	do.	298	High Line Canal, division 7, laterals 1-19.	do.	7,600	.145	.1668	.145
Do.	Apr. 8, 1915	299	St. Mary Canal, check and station 90-91.	do.	190	.....	.....	No bids.
Do.	Apr. 30, 1915	300	St. Mary Canal, control stations 615+20.	do.	1,250	.....	.....	No bids.
Do.	do.	300	St. Mary Canal, sluice gate, station 884.	do.	4,000	.....	.....	No bids.
Do.	do.	300	St. Mary Canal, pipe culverts, Cow Creek.	do.	4,000	.....	.....	No bids.
Do.	do.	300	St. Mary Canal, culvert, station 253.	do.	1,150	.....	.....	No bids.
Do.	May 12, 1915	301	Nelson Reservoir, South Canal.	do.	95,000	.137	.139	.137

Utah, Strawberry Valley	May 19, 1915	333	High Line Canal, division 8, lateral 20.	do.	30,000	14	15	14
Do.	June 16, 1915	335	High Line Canal, division 9, laterals	do.	22,000	16	20	16
Do.	July 16, 1915	336	High Line Canal, division 10, laterals	do.	50,000	19	20	20
Oregon-California, Klamath	Mar. 9, 1915	Inf.	G Canal, schedules 6 and 7	do.	8,422	18	21	18
Do.	do.	Inf.	G Canal, schedules 36, 37, 39, 40, 41.	do.	12,865	18	18	18
Do.	do.	Inf.	G Canal, schedules 8, 10.	do.	9,577	18	16	16
Do.	do.	Inf.	G Canal, schedule 12.	do.	4,577	18	18	18
Nebraska-Wyoming, North Platte	July 11, 1914	Inf.	Low Line Canal, schedules 18, 19, 20	do.	18,700	15	15	15
Do.	do.	Inf.	Low Line Canal, drain lateral	do.	11,500	11	15	15
Do.	Aug. 1, 1914	Inf.	Low Line Canal, schedules 21, 22, 23	do.	17,500	12	15	15
Do.	Aug. 22, 1914	Inf.	Low Line Canal, schedule 32	do.	11,500	10	15	15
Do.	do.	Inf.	Low Line Canal, schedule 33	do.	11,800	10	15	15
Do.	do.	Inf.	Low Line Canal, schedule 34	do.	12,700	9	15	15
Do.	Sept. 19, 1914	Inf.	Low Line laterals, schedule 4	do.	12,250	9	15	15
Do.	do.	Inf.	Low Line Canal, schedule 34	do.	14,400	9	15	15
Do.	do.	Inf.	Low Line laterals, schedule 5	do.	7,260	9	15	15
Do.	do.	Inf.	Low Line laterals, schedule 6	do.	7,240	9	15	15
Do.	May 7, 1915	Inf.	Lateral extensions, schedule 1	do.	4,000	9	15	15
Do.	do.	Inf.	Lateral extensions, schedule 2	do.	5,000	9	15	15
Do.	do.	Inf.	Lateral extensions, schedule 3	do.	1,500	9	15	15
Do.	do.	Inf.	Lateral extensions, schedule 4	do.	1,700	9	15	15
Do.	do.	Inf.	Lateral extensions, schedule 5	do.	3,800	9	15	15
Do.	do.	Inf.	Lateral extensions, schedule 6	do.	2,500	9	15	15

## EXCAVATION, CLASS 2 (INDURATED MATERIAL).

Arizona, Salt River	Aug. 17, 1914	278	Cave Creek cut-off, Arizona Canal, item 2, schedule 1.	Cubic yards	100	\$0.119	\$0.35	\$0.119
Do.	do.	278	Cave Creek cut-off, Arizona Canal, item 5, schedule 2.	do.	100	.35	.35	.119
Montana, Milk River	Aug. 24, 1914	280	Wallace Feeder Canal	do.	100	.20	.35	.80
Do.	Oct. 28, 1914	281	Dodson Canal at Dodson Branch, schedule 1	do.	6,700	.40	.60	.40
Do.	do.	281	Dodson Canal at Dodson Branch, schedule 2	do.	100	.75	2.00	.75
Do.	Oct. 13, 1914	282	Nelson Reservoir, schedule 1	do.	100	.30	.45	.55
Do.	do.	282	Nelson Reservoir, schedule 2	do.	30	.60	.75	.75
Arizona, Sun River	Dec. 8, 1914	283	Fishrun Reservoir Supply Canal	do.	11,000	.45	.47	.45
Utah, Strawberry Valley	Nov. 16, 1914	284	High Line Canal, division 1	do.	50,000	.186	.20	.205
Do.	do.	284	High Line Canal, division 2	do.	15,000	.13	.15	.27
Do.	do.	284	High Line Canal, division 3	do.	14,000	.215	.24	.40
Do.	Dec. 16, 1914	287	Pablo lateral A and sublaterals	do.	600	.35	.45	.60
Do.	Dec. 22, 1914	288	Pablo, lateral 31A and sublateral structure, schedule 1.	do.	160	.30	.78	.78
Do.	do.	288	Pablo, lateral 31A and sublateral structure, schedule 2.	do.	150	.30	.78	.78
Do.	do.	288	Pablo, lateral A and sublateral structure, schedule 3.	do.	100	.30	.78	.78
Montana, Sun River	do.	289	Greenfields Canal, schedule 1	do.	1,500	.30	.32	.32
Do.	do.	289	Greenfields Canal, schedule 2	do.	500	.30	.32	.32
Do.	do.	289	South Canal, stations 0-23, schedule 3	do.	250	.30	.32	.32
Do.	do.	289	South Canal, stations 23-62, schedule 4	do.	200	.30	.32	.32

*Unit bids and contract prices on formal specifications—Continued.*  
EXCAVATION, CLASS 2 (INDURATED MATERIAL)—Continued.

State and project.	Date opening bids.	Specification number.	Feature or description.	Unit.	Quantity.	Bids per unit.		Contract price.
						Lowest.	Next.	
Montana, Sun River.....	Dec. 22, 1914	289	Mt. Coulee Canal, schedule 5.....	Cubic yards.....	100	\$0.30	\$0.32	\$0.32
Do.....	July 1, 1915	292	Greenfields distribution system:					
Do.....	do.	292	Schedule 1, laterals, Sun River Slope Canal.....	do.	900	.20	.25	.20
Do.....	do.	292	Schedule 2, laterals, Greenfields Canal.....	do.	1,000	.20	.25	.20
Do.....	do.	292	Schedule 3, laterals, Greenfields Canal.....	do.	900	.20	.25	.20
Do.....	do.	292	Schedule 4, laterals, Sun River Slope Canal.....	do.	800	.20	.25	.20
Do.....	do.	292	Schedule 5, laterals, Greenfields Canal.....	do.	1,000	.20	.25	.20
Do.....	do.	292	Schedule 6, structures, laterals, Greenfields and South Canals.....	do.	350	.28	.45	.50
Do.....	do.	292	Schedule 7, structures, laterals, Sun River and South Canals.....	do.	800	.28	.45	.50
Do.....	do.	292	Schedule 8, structures, laterals, Sun River and South Canals.....	do.	800	.28	.45	.50
Do.....	do.	292	Schedule 9, structures, laterals, Greenfields Canal.....	do.	800	.28	.45	.50
Do.....	do.	292	Schedule 10, highway bridges.....	do.	5,000	.28	.40	.75
Colorado, Uncompahgre.....	Jan. 6, 1915	292	Selig Canal system, schedule 1, lateral No. 1.....	do.	200	.205	.21	.205
Do.....	do.	293	Selig Canal system, schedule 2, lateral No. 2.....	do.	1,250	.205	.21	.205
Do.....	do.	293	Selig Canal system, schedule 3, lateral No. 3.....	do.	1,000	.205	.21	.205
Do.....	do.	293	Selig Canal system, schedule 4, lateral No. 3A.....	do.	900	.205	.21	.205
Do.....	do.	293	Selig Canal system, schedule 5, lateral No. 4.....	do.	850	.205	.21	.205
Do.....	do.	293	Selig Canal system, schedule 6, lateral No. 5.....	do.	750	.205	.21	.205
Do.....	do.	293	Selig Canal system, schedule 7, lateral No. 6.....	do.	600	.205	.21	.205
Do.....	do.	293	Selig Canal system, schedule 8, lateral No. 7, stations 0-50.....	do.	1,100	.205	.21	.205
Do.....	do.	293	Selig Canal system, schedule 9, lateral No. 7, stations 80-170.....	do.	1,250	.205	.21	.205
Do.....	do.	293	Selig Canal system, schedule 10, lateral No. 7, stations 170-204.....	do.	1,250	.205	.21	.205
Do.....	do.	293	Selig Canal system, schedule 11, lateral No. 8.....	do.	1,000	.205	.21	.205
Do.....	do.	293	Selig Canal system, schedule 12, lateral No. 8A.....	do.	200	.205	.21	.205
Do.....	do.	293	Selig Canal system, schedule 13, lateral No. 9.....	do.	400	.205	.21	.205
Do.....	do.	293	Selig Canal system, schedule 14, lateral No. 10.....	do.	550	.205	.21	.205
Do.....	do.	293	Selig Canal system, schedule 15, lateral No. 11.....	do.	650	.17	.205	.17
Do.....	do.	293	Selig Canal system, schedule 16, extension stations 0-10.....	do.	1,050	.205	.21	.205
Do.....	do.	293	Selig Canal system, schedule 17, extension stations 10-531.....	do.	2,000	.205	.21	.205
Do.....	do.	293	Selig Canal system, schedule 18, extension stations 531-630.....	do.	1,150	.205	.21	.205

[illegible]

**EXCAVATION, CLASS 3 (ROCK).**

			Cubic yards.	\$0.95	\$1.00	\$0.95
Montana, Milk River.....	Oct. 28, 1914	281	Dodson Canal at Dodson Branch, schedule 1.....	8,000		
Do., do.....	do.	281	Dodson Canal at Dodson Branch, schedule 2.....	750	2.60	.75
Do., do.....	Oct. 13, 1914	282	Nelson Reservoir, schedule 1.....	500	.90	.80
Do., do.....	do.	282	Nelson Reservoir, schedule 2.....	20		
Do., do.....	do.	282	Pishkun Reservoir supply canal.....	8,500	.90	.87
Montana, Sun River.....	Dec. 8, 1914	283	High Line Canal, division 1.....	1,000	.48	.45
Utah, Strawberry Valley.....	Nov. 16, 1914	284	High Line Canal, division 2.....	1,000	.13	.10
Do., do.....	do.	284	High Line Canal, division 3.....	1,000	.215	.20
Do., do.....	do.	284	Pablo lateral A and sublaterals.....	1,400	.90	.80
Do., do.....	Dec. 15, 1914	287				
Montana, Flathead (Indian)						



*Unit bids and contract prices on formal specifications—Continued.*

## EXCAVATION, CLASS 3 (ROCK)—Continued.

State and project.	Date opening bids.	Specification number.	Feature or description.	Unit.	Quantity.	Bids per unit.		Contract price.
						Lowest.	Next.	
Montana, Flathead (Indian).....	Dec. 22, 1914	288	Pablo lateral 31A and sublaterals, structures, schedule 1.	Cubic yards....	30	\$1.50	\$1.80	\$1.50
Do.....	do.....	288	Pablo lateral 31A and sublaterals, structures, schedule 2.	do.....	50	1.50	1.80	1.50
Do.....	do.....	288	Pablo lateral A and sublaterals, structures, schedule 3.	do.....	50	1.80	2.00	2.00
Montana, Sun River.....	do.....	289	Greenfields Canal, schedule 1.	do.....	150	.60	.75	.60
Do.....	do.....	289	Greenfields Canal, schedule 2.	do.....	50	.60	.70	.60
Do.....	do.....	289	South Canal, stations 0-229, schedule 3.	do.....	50	.60	.70	.60
Do.....	do.....	289	South Canal, stations 229-622, schedule 4.	do.....	50	.60	.70	.60
Do.....	do.....	289	Mill Creek Canal, schedule 5.	do.....	50	.60	.70	.60
Do.....	July 1, 1915	292	Greenfields distribution system.	do.....	50	.25	.50	.70
Do.....	do.....	292	Schedule 1, laterals, Sun River Slope Canal.	do.....	50	.60	.70	.70
Do.....	do.....	292	Schedule 2, laterals, Greenfields Canal.	do.....	50	.50	.70	.70
Do.....	do.....	292	Schedule 3, laterals, Sun River Slope Canal.	do.....	40	.50	.70	.70
Do.....	do.....	292	Schedule 4, laterals, Sun River Slope Canal.	do.....	40	.50	.70	.70
Do.....	do.....	292	Schedule 5, laterals, Greenfields Canal.	do.....	50	.50	.70	.70
Do.....	do.....	292	Schedule 6, structures, laterals, Greenfields Canal.	do.....	50	.28	.50	.50
Do.....	do.....	292	Schedule 7, structures, laterals, Sun River Slope Canal.	do.....	60	.28	.50	.50
Do.....	do.....	292	Schedule 8, structures, Sun River Slope Canal.	do.....	70	.28	.50	.50
Do.....	do.....	292	Schedule 9, structures, Greenfields Canal.	do.....	60	.28	.50	.50
Do.....	do.....	292	Schedule 10, highway bridges.	do.....	20	.28	.50	1.25
Colorado, Uncompahgre.....	Jan. 5, 1915	293	Selig Canal system, schedule 1, lateral No. 1.	do.....	100	.205	.21	.205
Do.....	do.....	293	Selig Canal system, schedule 2, lateral No. 2.	do.....	650	.205	.21	.205
Do.....	do.....	293	Selig Canal system, schedule 3, lateral No. 3.	do.....	500	.205	.21	.205
Do.....	do.....	293	Selig Canal system, schedule 4, lateral No. 3A.	do.....	500	.205	.21	.205
Do.....	do.....	293	Selig Canal system, schedule 5, lateral No. 4.	do.....	500	.205	.21	.205
Do.....	do.....	293	Selig Canal system, schedule 6, lateral No. 5.	do.....	400	.205	.21	.205
Do.....	do.....	293	Selig Canal system, schedule 7, lateral No. 6.	do.....	300	.205	.21	.205
Do.....	do.....	293	Selig Canal system, schedule 8, lateral No. 7, stations 0-80.	do.....	650	.205	.21	.205
Do.....	do.....	293	Selig Canal system, schedule 9, lateral No. 7, stations 80-170.	do.....	650	.205	.21	.205
Do.....	do.....	293	Selig Canal system, schedule 10, lateral No. 7, stations 170-284.	do.....	700	.205	.21	.205
Do.....	do.....	293	Selig Canal system, schedule 11, lateral No. 8.	do.....	550	.205	.21	.205
Do.....	do.....	293	Selig Canal system, schedule 12, lateral No. 8A.	do.....	500	.205	.21	.205
Do.....	do.....	293	Selig Canal system, schedule 13, lateral No. 9.	do.....	300	.205	.21	.205

Do.....	do.....	233	Selig Canal system, schedule 14, lateral No. 10.....	do.....	300	.205	.21	.205
Do.....	do.....	233	Selig Canal system, schedule 15, lateral No. 11.....	do.....	350	.17	.205	.17
Do.....	do.....	233	Selig Canal system, schedule 16, extension, stations 466-510.....	do.....	600	.205	.21	.205
Do.....	do.....	233	Selig Canal system, schedule 17, extension, stations 510-531.....	do.....	1,200	.205	.21	.205
Do.....	do.....	233	Selig Canal system, schedule 18, extension, stations 531-630.....	do.....	600	.205	.21	.205
Do.....	do.....	233	Selig Canal system, schedule 19, extension, stations 630-704.....	do.....	600	.17	.205	.17
Utah, Strawberry Valley.....	Feb. 3, 1915	235	High Line Canal, division 4.....	do.....	13,000	.22	.274	.22
Do.....	Feb. 24, 1915	236	High Line Canal, schedule 1, lateral 30.....	do.....	305	.18	.22	.70
Colorado, Grand Valley.....	Mar. 10, 1915	237	Main Canal, stations 1833-2035.....	do.....	100	.16	.26	.65
Do.....	do.....	237	Main Canal, schedule 2, stations 2035-2197.....	do.....	100	.16	.16	.70
Do.....	do.....	237	Main Canal, schedule 3, stations 2197-2317.....	do.....	100	.14	.16	.70
Do.....	do.....	237	Main Canal, schedule 4, stations 2317-2437.....	do.....	100	.16	.19	.65
Do.....	do.....	237	Main Canal, schedule 5, lateral 1, 2, 5, 6, 7, 10, 11, 12, 25, 26.....	do.....	10	.15	.19	.70
Do.....	do.....	237	Main Canal, schedule 6, lateral 14, 15, 16, 17, 20, 21, 22, 25, 26.....	do.....	10	.15	.19	.70
Utah, Strawberry Valley.....	do.....	237	Main Canal, schedule 7, lateral 30, 33, 35, 38, 40.....	do.....	10	.15	.19	.70
Do.....	do.....	238	High Line Canal, lateral 32 and 33.....	do.....	200	.01	.14	1.25
Do.....	Apr. 8, 1915	239	High Line Canal, division 7, lateral 1-19.....	do.....	100	.145	.18	1.145
Montana, Milk River.....	May 12, 1915	301	Nelson Reservoir south canal.....	do.....	60	.70	.90	1.00
Utah, Strawberry Valley.....	May 19, 1915	303	High Line Canal, division 8, lateral 20.....	do.....	100	.14	.75	1.00
Do.....	June 16, 1915	305	High Line Canal, division 9, lateral.....	do.....	1,000	.16	1.50	.16
Do.....	July 15, 1915	306	High Line Canal, division 10, lateral.....	do.....	2,500	1.00	1.25	1.00

## EXCAVATION, EMBANKMENTS.

Montana, Milk River.....	Oct. 13, 1914	232	Nelson Reservoir, schedule 1.....	Cubic yards.....	8,000	\$0.155	\$0.156	\$0.155
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## EXCAVATION, MISCELLANEOUS AND SHALE.

Wyoming, Snake River storage.....	July 23, 1914	274	Item 42 excavating for rockfill in wing walls.....	Cubic yards.....	400	\$0.40	\$1.25	\$0.40
Colorado, Grand Valley.....	Mar. 10, 1915	297	Main Canal, schedule 1, stations 1633-2035 (shale).....	do.....	1,000	.16	.26	.37
Do.....	do.....	297	Main Canal, schedule 2, stations 2035-2197 (shale).....	do.....	500	.16	.16	.44
Do.....	do.....	297	Main Canal, schedule 3, stations 2197-2317 (shale).....	do.....	400	.14	.16	.44
Do.....	do.....	297	Main Canal, schedule 4, stations 2317-2437 (shale).....	do.....	1,000	.16	.19	.37
Do.....	do.....	297	Main Canal, schedule 5, station lateral 1, 2, 5, 6, 7, 10, 11, 12 (shale).....	do.....	50	.15	.19	.44
Do.....	do.....	297	Main Canal, schedule 6, station lateral 14, 15, 16, 17, 20, 21, 25, 29 (shale).....	do.....	50	.15	.19	.44
Do.....	do.....	297	Main Canal, schedule 7, station lateral 30, 33, 35, 38, 40 (shale).....	do.....	50	.15	.19	.44

*Unit bids and contract prices on formal specifications—Continued.*

## EXCAVATION, STRUCTURES.

State and project.	Date opening bids.	Specification number.	Feature or description.	Unit.	Quantity.	Bids per unit.		Contract price.
						Lowest.	Next.	
Arizona, Salt River.	Aug. 24, 1914	280	Wallace Feeder Canal.	Cubic yards.	180	\$0.30	\$0.45	\$0.90
Utah, Strawberry Valley.	Nov. 16, 1914	284	High Line Canal, division 1.	do.	130	.50	.55	.50
Do.	do.	284	High Line Canal, division 2.	do.	680	.10	.30	.10
Do.	do.	284	High Line Canal, division 3.	do.	1,850	.30	.40	.75
Do.	Feb. 3, 1915	295	High Line Canal, division 4, class 1.	do.	2,500	.40	.50	.50
Do.	do.	296	High Line Canal, division 4, class 2.	do.	100	1.00	1.00	1.00
Do.	Feb. 24, 1915	296	High Line Canal, lateral 30, class 1.	do.	490	.35	.45	.45
Do.	do.	296	High Line Canal, lateral 30, class 2.	do.	100	.25	.70	.70
Do.	Mar. 10, 1915	298	High Line Canal, laterals 32 and 33, class 1.	do.	50	.25	1.00	1.00
Do.	do.	298	High Line Canal, laterals 32 and 33, class 2.	do.	50	.30	.45	.45
Do.	do.	298	High Line Canal, laterals 32 and 33, class 3.	do.	50	.50	.70	.75
Do.	Apr. 8, 1915	299	High Line Canal, division 7, laterals 1-19, class 1.	do.	50	.50	.70	1.50
Do.	do.	299	High Line Canal, division 7, laterals 1-19, class 2.	do.	1,000	.40	.50	.40
Do.	do.	299	High Line Canal, division 7, laterals 1-19, class 3.	do.	100	.40	.50	.40
Do.	May 19, 1915	303	High Line Canal, division 8, lateral 20, class 1.	do.	100	.40	.45	.40
Do.	do.	303	High Line Canal, division 8, lateral 20, class 2.	do.	3,000	.40	.45	.50
Do.	do.	303	High Line Canal, division 8, lateral 20, class 3.	do.	200	.50	.60	.50
Do.	June 16, 1915	305	High Line Canal, division 9, laterals, class 1.	do.	100	.50	1.00	1.50
Do.	do.	305	High Line Canal, division 9, laterals, class 2.	do.	2,000	.50	.50	.50
Do.	do.	305	High Line Canal, division 9, laterals, class 3.	do.	500	.50	.60	.50
Do.	July 15, 1915	306	High Line Canal, division 10, laterals, class 1.	do.	200	.50	2.00	.50
Do.	do.	306	High Line Canal, division 10, laterals, class 2.	do.	2,500	.40	.60	.50
Do.	do.	306	High Line Canal, division 10, laterals, class 3.	do.	300	.50	.60	.50
Do.	do.	306	High Line Canal, division 10, laterals, class 3.	do.	200	1.00	1.50	1.00

## EXCAVATION, TRENCHES.

Montana, Milk River.	Oct. 28, 1914	281	Dodson Canal at Dodson Bridge, class 1.	Cubic yards.	2,700	\$0.40	\$0.50	\$0.40
Do.	do.	281	Dodson Canal at Dodson Bridge, class 2.	do.	100	.60	.75	.60
Do.	do.	281	Dodson Canal at Dodson Bridge, class 3.	do.	10	1.50	2.50	1.50

## EXCAVATION, WET, CLASS 1.

Montana, Milk River.	Oct. 13, 1914	282	Nelson Reservoir, schedule 2.	Cubic yards.	870	\$1.67	\$2.00	\$1.67
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## FENCE, REBUILDING.

Arizona, Salt River.....	Aug. 17, 1914	278	Cave Creek cut-off, Arizona Canal, schedule 1.....	Rods.....	70	\$0.25	\$0.40	\$0.40
Do.....	do.....	278	Cave Creek cut-off, Arizona Canal, schedule 2.....	do.....	20	.25	.40	.40
Do.....	Aug. 24, 1914	280	Wallace Feeder Canal.....	do.....	2,000	.30	.35	.175

## FLUMES, METAL (ERECTION).

Montana, Sun River.....	July 1, 1915	292	Greenfields distribution system: Schedule 8, laterals, Greenfields Canal, 2 feet 7 inches diameter.....	Linear feet.....	360	\$0.40	\$0.50	\$0.40
Do.....	do.....	292	Schedule 8, laterals, Greenfields Canal, 3 feet 2 inches diameter.....	do.....	10	.40	.60	.40
Do.....	do.....	292	Schedule 8, laterals, Greenfields Canal, 3 feet 10 inches diameter.....	do.....	5	.50	.75	.50

## FLUMES, METAL (FURNISHING).

Montana, Milk River.....	July 1, 1914	270	Flume, 5 feet 9 inches diameter, item 1.....	Linear feet.....	97	\$1.04	\$1.17	\$1.17
Do.....	do.....	270	Flume, 5 feet 9 inches diameter, item 2.....	do.....	32	1.17	1.26	1.17
Do.....	do.....	270	Flume, 6 feet 4 1/2 inches, item 3.....	do.....	95	1.24	1.33	1.33
Do.....	do.....	270	Flume, 7 feet diameter, item 4.....	do.....	5	1.82	1.94	1.94
Do.....	do.....	270	Flume, 10 feet 10 inches diameter, item 5.....	do.....	1,390	2.99	3.00	2.07
Do.....	do.....	270	Flume, 10 feet 10 inches diameter, item 6.....	do.....	140	3.70	3.77	13.00
Do.....	do.....	270	Flume, 11 feet 5 1/2 inches diameter, item 7.....	do.....	7	4.71	4.90	3.77
								4.90

## GATES, CAST-IRON.

Montana, Milk River.....	Aug. 4, 1914	277	Item 51, gate and frames, 4 by 4 feet head, 22 inches Item 53, gate and frames, 4 by 6 feet head, 43 inches.....	Number.....	3	\$210.00	\$232.00	\$232.00
Montana, Sun River.....	do.....	277		do.....	1	220.00	247.35	278.00

## GATES, ERECTION, AND OTHER METAL WORK.

Montana, Sun River.....	July 1, 1915	292	Greenfields distribution system: Schedule 7, laterals, Greenfields and Sun River Canals.....	Pounds.....	16,000	\$0.02	\$0.04	\$0.02
Do.....	do.....	292	Schedule 8, laterals, Greenfields Canal.....	do.....	14,000	.02	.04	.02
Do.....	do.....	292	Schedule 9, laterals, Greenfields Canal.....	do.....	19,000	.02	.04	.02

1 140 sheets of metal, 32 inches wide and 204 inches long, furnished to contractor free of cost.

## Unit bids and contract prices on formal specifications—Continued.

## GATES, RADIAL (STRUCTURAL STEEL).

State and project.	Date opening bids.	Specification number.	Feature or description.	Unit.	Quantity.	Bids per unit.		Contract price.
						Lowest.	Next.	
Montana, Milk River, St. Mary .....	Aug. 4, 1914	277	Item 49, gates and appurtenances, total weight, 49,000 pounds.	Number .....	9	\$240.00	\$306.00	\$240.00
Do.....	.....do.....	277	Item 50, gates and appurtenances, total weight, 14,000 pounds.	.....do.....	5	103.00	150.00	150.00

## GATES, STRUCTURAL STEEL, AND FRAMES.

Montana, Sun River .....	Aug. 4, 1914	277	Item 1, opening 5 by 10 feet, weight, total, 9,800 pounds.	Number.....	2	\$367.00	\$368.00	\$375.00
Do.....	.....do.....	277	Item 2, opening 3 feet 4 inches by 8 feet, weight, total, 10,200 pounds.	.....do.....	3	250.00	263.33	250.00
Montana, Milk River.....	.....do.....	277	Item 3, opening 3 by 5 feet 6 inches, weight, total, 20,200 pounds.	.....do.....	8	190.00	197.00	190.00
Do.....	.....do.....	277	Item 4, opening 4 by 5 feet, weight, total, 9,800 pounds.	.....do.....	7	122.00	155.00	155.00
Montana, Sun River.....	.....do.....	277	Item 4, opening 4 by 5 feet, weight, total, 1,400 pounds.	.....do.....	1	122.00	155.00	155.00
Montana, Flathead (Indian) .....	.....do.....	277	Item 5, opening 4 by 4 feet 6 inches, weight, total, 8,500 pounds.	.....do.....	4	111.00	141.50	141.50
Montana, Blackfoot (Indian) .....	.....do.....	277	Item 6, opening 4 by 4 feet, weight, total, 3,700 pounds.	.....do.....	3	104.00	134.00	134.00
Montana, Milk River.....	.....do.....	277	Item 6, opening 4 by 4 feet, weight, total, 3,700 pounds.	.....do.....	3	104.00	134.00	134.00
Montana, Fort Peck (Indian) .....	.....do.....	277	Item 7, opening 4 by 3 feet, weight, total, 3,900 pounds.	.....do.....	4	84.00	115.00	115.00
Do.....	.....do.....	277	Item 8, opening 3 by 4 feet, weight, total, 1,100 pounds.	.....do.....	1	95.00	103.00	103.00
Montana, Flathead (Indian) .....	.....do.....	277	Item 9, opening 3 by 3 feet 6 inches, weight, total, 4,900 pounds.	.....do.....	5	66.00	98.00	98.00
Do.....	.....do.....	277	Item 10, opening 3 by 3 feet, weight, total, 3,600 pounds.	.....do.....	4	66.00	90.00	90.00
Montana, Sun River.....	.....do.....	277	Item 10, opening 3 by 3 feet, weight, total, 2,700 pounds.	.....do.....	3	66.00	90.00	90.00
Montana, Milk River.....	.....do.....	277	Item 10, opening 3 by 3 feet, weight, total, 900 pounds.	.....do.....	1	66.00	90.00	90.00
Montana, Sun River.....	.....do.....	277	Item 11, opening 2 feet 8 inches by 2 feet 8 inches, weight, total, 800 pounds.	.....do.....	1	56.00	95.00	95.00

Do.....	Item 12, metal-work railing, for Item 11, 800 pounds.	Lump sum.....	37.00	48.00	37.00
Montana, Blackfeet (Indian)	Item 13, opening, 4 by 4 feet, total weight, 5,200 pounds, 2 sets of 3 gates.	Sets.....	180.00	273.00	273.00
Montana, Flathead (Indian)	Item 14, opening, 4 feet 5 inches by 4 feet 3 inches, total weight, 2,200 pounds.	Number.....	35.00	54.00	35.00
Montana, Milk River	Item 15, opening, 4 by 2 feet, total weight, 350 pounds.	.....do.....	15.75	20.00	20.00
Do.....	Item 16, opening, 4 by 2 feet, total weight, 675 pounds.	.....do.....	15.00	18.50	18.50
Do.....	Item 17, opening, 4 by 2 feet, total weight, 300 pounds.	.....do.....	13.00	16.00	16.00
Do.....	Item 18, opening, 4 by 2 feet, total weight, 250 pounds.	.....do.....	12.75	15.50	15.50
Do.....	Item 19, opening, 4 by 2 feet, total weight, 250 pounds.	.....do.....	12.25	15.00	15.00
Do.....	Item 20, opening, 3 feet 4 inches by 3 feet 4 inches, total weight, 325 pounds.	.....do.....	15.50	17.00	17.00
Do.....	Item 21, opening, 3 feet 4 inches by 3 feet 4 inches, total weight, 325 pounds.	.....do.....	15.25	17.00	17.00
Do.....	Item 22, opening, 3 feet 2 inches by 2 feet, total weight, 210 pounds.	.....do.....	11.50	12.00	15.00
Do.....	Item 23, opening, 3 by 3 feet, total weight, 575 pounds.	.....do.....	13.50	13.75	13.50
Do.....	Item 24, opening, 3 by 3 feet, total weight, 550 pounds.	.....do.....	13.00	13.50	13.50
Do.....	Item 25, opening, 3 by 2 feet, total weight, 525 pounds.	.....do.....	12.25	13.50	13.50
Do.....	Item 26, opening, 3 by 2 feet, total weight, 250 pounds.	.....do.....	12.50	15.00	15.50
Do.....	Item 27, opening, 2 feet 10 inches by 2 feet 10 inches, total weight, 540 pounds.	.....do.....	12.50	13.00	12.50
Do.....	Item 28, opening, 2 feet 10 inches by 2 feet 10 inches, total weight, 570 pounds.	.....do.....	12.00	14.00	14.00
Do.....	Item 29, opening, 2 feet 4 inches by 2 feet 4 inches, total weight, 200 pounds.	.....do.....	10.50	11.00	12.50
Do.....	Item 30, opening, 2 feet 4 inches by 2 feet 4 inches, total weight, 400 pounds.	.....do.....	11.00	11.50	12.00
Do.....	Item 31, opening, 2 feet 4 inches by 2 feet 4 inches, total weight, 200 pounds.	.....do.....	11.00	12.00	12.50
Do.....	Item 32, opening, 2 feet 4 inches by 2 feet 4 inches, total weight, 200 pounds.	.....do.....	11.25	12.00	12.50
Do.....	Item 33, opening, 2 feet by 2 feet 4 inches, total weight, 1,000 pounds.	.....do.....	11.00	12.00	11.00
Wyoming, Shoshone	Item 34, opening, 2 feet by 2 feet 4 inches, total weight, 1,850 pounds.	.....do.....	7.00	9.00	7.00
Montana, Milk River	Item 35, opening, 2 by 1 foot, total weight, 110 pounds.	.....do.....	8.00	8.50	8.50
Do.....	Item 36, opening, 1 foot 10 inches by 1 foot 10 inches, total weight, 600 pounds.	.....do.....	8.00	9.00	8.00
Do.....	Item 37, opening, 1 foot 10 inches by 1 foot 10 inches, total weight, 750 pounds.	.....do.....	8.00	9.00	8.00

*Unit bids and contract prices on formal specifications—Continued.*

## GATES, STRUCTURAL STEEL, AND FRAMES—Continued.

State and project.	Date opening bids.	Specification number.	Feature or description.	Unit.	Quantity.	Bids per unit.		Contract price.
						Lowest.	Next.	
Montana, Milk River	Aug. 4, 1914	277	Item 35, opening, 1 foot 10 inches by 1 foot 10 inches, total weight, 3,150 pounds.	Number	21	\$7.00	\$8.85	\$7.00
Do.	do.	277	Item 39, opening, 1 foot 10 inches by 1 foot 10 inches, total weight, 300 pounds.	do.	2	7.50	8.50	7.50
Do.	do.	277	Item 40, opening, 1 foot 6 inches by 1 foot 9 inches, total weight, 2,000 pounds.	do.	14	7.00	8.22	7.00
Wyoming, Shoshone.	do.	277	Item 41, opening, 1 foot 6 inches by 1 foot 6 inches, total weight, 125 pounds.	do.	1	7.75	8.00	9.00
Montana, Milk River	do.	277	Item 42, opening, 1 foot 3 inches by 1 foot 3 inches, total weight, 100 pounds.	do.	1	7.00	8.00	8.00
Do.	do.	277	Item 43, opening, 1 foot 3 inches by 1 foot 3 inches, total weight, 440 pounds.	do.	4	6.75	7.00	7.00
Do.	do.	277	Item 44, opening, 1 foot by 1 foot 2 inches, total weight, 1,875 pounds.	do.	15	6.00	7.24	6.00
Montana, Fort Peck (Indian)	do.	277	Item 45, opening, 24 by 24 inches, total weight, 1,290 pounds.	do.	8	7.00	8.15	7.00
Do.	do.	277	Item 46, opening, 18 by 18 inches, total weight, 1,300 pounds.	do.	10	6.45	6.50	6.50
Do.	do.	277	Item 47, opening, 16 by 16 inches, total weight, 360 pounds.	do.	3	6.30	7.50	7.50
Do.	do.	277	Item 48, opening 15 by 15 inches, total weight, 6,600 pounds.	do.	75	5.00	5.75	5.00

## GATE-LIFTING DEVICES.

Montana, Milk River	Aug. 4, 1914	277	Item 62, designed to lift 3,500 pounds.	Number	3	\$7.80	\$18.35	\$18.60
Do.	do.	277	Item 63, designed to lift 2,500 pounds.	do.	9	7.40	18.95	55.80
Do.	do.	277	Item 64, designed to lift 2,000 pounds.	do.	6	7.40	18.47	37.50
Do.	do.	277	Item 65, designed to lift 1,500 pounds.	do.	23	7.40	18.10	143.00
Do.	do.	277	Item 66, designed to lift 1,000 pounds.	do.	47	7.30	10.30	292.00
Wyoming, Shoshone.	do.	277	Item 67, designed to lift 500 pounds.	do.	15	7.10	8.00	143.00
Montana, Milk River	do.	277	Item 67, designed to lift 500 pounds.	do.	8	7.10	8.00	143.00

## GATE STANDS.

Montana, Milk River.....	Aug. 4, 1914	277	Item 52, single-speed, lift 25,000 pounds.....	Number.....	\$242.00	\$253.37	\$242.00
Montana, Sun River.....	do.	277	Item 52, single-speed, lift 40,000 pounds.....	do.	253.75	500.00	743.00
Do.....	do.	277	Item 52, two-speed, lift 45,000 pounds.....	do.	424.40	500.00	424.40
Montana, Milk River.....	do.	277	Item 57, two-speed, lift 20,000 pounds.....	do.	252.50	358.00	12,421.00
Do.....	do.	277	Item 57, two-speed, lift 10,000 pounds.....	do.	172.43	184.60	103.40
Montana, Sun River.....	do.	277	Item 57, single-speed, lift 10,000 pounds.....	do.	172.43	184.60	103.40
Montana, Blackfoot (Indian)	do.	277	Item 58, single-speed, lift 7,000 pounds.....	do.	83.00	175.43	103.40
Montana, Flathead (Indian)	do.	277	Item 58, single-speed, lift 7,000 pounds.....	do.	83.00	175.43	103.40
Montana, Blackfoot (Indian)	do.	277	Item 59, single-speed, lift 6,000 pounds.....	do.	81.50	147.40	83.00
Montana, Fort Peck (Indian)	do.	277	Item 59, single-speed, lift 6,000 pounds.....	do.	81.50	144.50	81.50
Montana, Sun River.....	do.	277	Item 59, single-speed, lift 6,000 pounds.....	do.	81.50	144.50	81.50
Montana, Fort Peck (Indian)	do.	277	Item 60, single-speed, lift 5,000 pounds.....	do.	78.00	128.40	78.00
Montana, Milk River.....	do.	277	Item 60, single-speed, lift 5,000 pounds.....	do.	78.00	128.40	78.00
Montana, Sun River.....	do.	277	Item 60, single-speed, lift 5,000 pounds.....	do.	78.00	128.40	78.00
Montana, Flathead (Indian)	do.	277	Item 60, single-speed, lift 5,000 pounds.....	do.	78.00	128.40	78.00
Do.....	do.	277	Item 61, single-speed, lift 5,000 pounds.....	do.	78.67	120.00	78.67

## GENERATOR.

Arizona, Salt River.....	July 14, 1914	272	Item 1, vertical alternating current, 5,000 kva., weight, 125,400 pounds (lump sum).	Number.....	\$21,694.00	\$22,820.00	\$21,694.00
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## HAULING.

Wyoming, Snake River storage.....	July 22, 1914	274	Item 4, bridge, steel, Victor, Idaho, to Gros Ventre, Wyo.	Ton.....	7.50	20.00	.....
Do.....	do.	274	Item 3, 130 spans and 3 steel piers (lump sum).	.....	.....	.....	.....
Do.....	do.	274	Item 22, bridge, Victor to Jackson site (lump sum).	Ton.....	7.50	20.00	\$20.00

## LUMBER, BRIDGE, FURNISHED.

Wyoming, Snake River storage.....	July 22, 1914	274	Item 6, red fir, for bridge floor, etc.	M. B. M.....	23.50	48.00	.....
Do.....	do.	274	Item 5, red fir, for west approach.....	do.	22.50	48.00	.....
Do.....	do.	274	Item 5, red fir, for bridge floor, etc.	do.	22.50	48.00	.....
Do.....	do.	274	Item 28, red fir, for bridge approach.....	do.	22.50	48.00	\$27.50
Do.....	do.	274	Item 28, red fir, for abutments, wings	do.	22.50	48.00	.....
Do.....	do.	274	Item 30, red fir, for bridge approaches.....	do.	22.50	48.00	27.50

## 1 Lump sum.



*Unit bids and contract prices on formal specifications—Continued.*  
LUMBER, PLACING.

State and project.	Date opening bids.	Specification number.	Feature or description.	Unit.	Quantity.	Bids per unit.		Contract price.
						Lowest.	Next.	
Wyoming, Snake River storage.	July 22, 1914	274	Item 17, floor, bridge approach.	M. B. M.	140	\$17.00	\$26.00	.....
Do.	do.	274	Item 18, floor bridge.	do.	40	13.00	17.00	.....
Do.	do.	274	Item 37, bridge approaches.	do.	177	17.00	26.00	.....
Do.	do.	274	Item 38, bridge floors, etc.	do.	40	13.00	17.00	\$16.00
Do.	do.	274	Item 40, bridge wings abutments.	do.	26	10.00	17.00	10.00
Do.	do.	274	Item 44 (alter item 37).	do.	36	17.00	26.00	25.00
Arizona, Salt River.	Aug. 24, 1914	280	Wallace feeder canal (bridges).	do.	16.48	20.00	24.00	25.00
Montana, Milk River.	Oct. 13, 1914	283	Nelson Reservoir, structure.	do.	1.0	12.00	30.00	12.00
Montana, Sun River.	Dec. 8, 1914	283	Pishkum Reservoir supply canal, structure.	do.	28	13.00	14.00	13.00
Montana, Milk River.	Jan. 12, 1915	291	St. Mary River crossing, bridge approaches.	do.	4	6.00	6.25	9.80
Montana, Sun River.	July 1, 1915	292	Greenfields distribution system.	do.				
Do.	do.	292	Schedule 7, laterals, Sun River and Greenfields Canals.	do.	16.5	10.00	18.00	10.00
Do.	do.	292	Schedule 8, laterals, Greenfields Canal.	do.	21.5	10.00	18.00	10.00
Do.	do.	292	Schedule 9, laterals, Greenfields Canal.	do.	22.5	10.00	18.00	10.00
Do.	do.	292	Schedule 10, highway bridges.	do.	205.0	10.00	11.00	12.50
Montana, Milk River.	Oct. 28, 1914	281	Dodson Canal at Dodson bridge.	Sta. yards.	100,000			\$0.02
Do.	Oct. 13, 1914	283	Nelson Reservoir, schedule 1.	do.	2,000			02
Montana, Sun River.	Dec. 8, 1914	283	Pishkum Reservoir supply canal.	do.	15,000			02
Utah, Strawberry Valley.	Nov. 16, 1914	284	High Line Canal, division 1.	do.	1,000			02
Do.	do.	284	High Line Canal, division 2.	do.	1,000			02
Do.	do.	284	High Line Canal, division 3.	do.	1,000			02
Montana, Flathead (Indian).	Dec. 5, 1914	287	Pablo, lateral A and sublaterals.	do.	5,000			02
Montana, Sun River.	Dec. 22, 1914	288	Greenfields Canal, schedule 1.	do.	1,500			02
Do.	do.	288	Greenfields Canal, schedule 2.	do.	1,500			02
Do.	do.	288	South Canal, station 0+229, schedule 3.	do.	1,500			02
Do.	do.	288	MAIL CO. Canal, station 229+692, schedule 4.	do.	1,500			02
Do.	do.	288	MAIL CO. Canal, schedule 5.	do.	2,000			02
Do.	July 1, 1915	292	Greenfields distribution system, schedule 1.	do.	900			02
Do.	do.	292	Greenfields distribution system, schedule 2.	do.	900			02
Do.	do.	292	Greenfields distribution system, schedule 3.	do.	1,300			02
Do.	do.	292	Greenfields distribution system, schedule 4.	do.	1,300			02
Do.	do.	292	Greenfields distribution system, schedule 5.	do.	900			02
Do.	do.	292	Greenfields distribution system, lateral No. 1.	do.	300			02
Colorado, Uncompahgre.	Jan. 5, 1915	293	Selig Canal system, schedule 1, lateral No. 1.	do.	2,000			02
Do.	do.	293	Selig Canal system, schedule 2, lateral No. 2.	do.				02

## OVERHAUL.

Do.	do.	293	Selig Canal system, schedule 2, lateral No. 3.	do.	1,000	02
Do.	do.	293	Selig Canal system, schedule 3, lateral No. 3A.	do.	1,000	02
Do.	do.	293	Selig Canal system, schedule 4, lateral No. 4.	do.	1,000	02
Do.	do.	293	Selig Canal system, schedule 5, lateral No. 5.	do.	1,000	02
Do.	do.	293	Selig Canal system, schedule 6, lateral No. 6.	do.	1,000	02
Do.	do.	293	Selig Canal system, schedule 7, lateral No. 7.	do.	3,000	02
Do.	do.	293	Selig Canal system, schedule 8, lateral No. 8.	do.	1,500	02
Do.	do.	293	Selig Canal system, schedule 9, lateral No. 7, station 80-170.	do.	1,500	02
Do.	do.	293	Selig Canal system, schedule 10, lateral No. 7, station 170-264.	do.	1,000	02
Do.	do.	293	Selig Canal system, schedule 11, lateral No. 8.	do.	1,000	02
Do.	do.	293	Selig Canal system, schedule 12, lateral No. 8A.	do.	1,000	02
Do.	do.	293	Selig Canal system, schedule 13, lateral No. 9.	do.	1,500	02
Do.	do.	293	Selig Canal system, schedule 14, lateral No. 10.	do.	500	02
Do.	do.	293	Selig Canal system, schedule 15, lateral No. 11.	do.	500	02
Do.	do.	293	Selig Canal system, schedule 16, extension, station 466-510.	do.	500	02
Do.	do.	293	Selig Canal system, schedule 17, extension, station 510-531.	do.	500	02
Do.	do.	293	Selig Canal system, schedule 18, extension, station 531-630.	do.	2,000	02
Do.	do.	293	Selig Canal system, schedule 19, extension, station 630-704.	do.	3,000	02
Utah, Strawberry Valley	Feb. 3, 1915	295	High Line Canal, division 4.	do.	10,000	02
Do.	Feb. 24, 1915	296	High Line Canal, lateral 30.	do.	1,000	02
Colorado, Grand Valley	Mar. 10, 1915	297	Main Canal, schedule 1, stations 1933-2005.	do.	210,000	02
Do.	do.	297	Main Canal, schedule 2, stations 2107-2317.	do.	18,000	02
Do.	do.	297	Main Canal, schedule 3, stations 2317-2377.	do.	18,000	02
Do.	do.	297	Main Canal, schedule 4, stations 2317-2437.	do.	25,000	02
Utah, Strawberry Valley	do.	298	High Line Canal, lateral 32 and 33.	do.	1,200	02
Do.	do.	298	High Line Canal, division 7, laterals 1-19.	do.	1,500	02
Do.	Apr. 8, 1915	299	Nelson Reservoir, South Canal.	do.	120,000	02
Montana, Milk River	May 12, 1915	301	High Line Canal, division 8, lateral 20.	do.	500	02
Utah, Strawberry Valley	May 19, 1915	303	High Line Canal, division 9, laterals.	do.	2,000	02
Do.	June 16, 1915	305	High Line Canal, division 10, laterals.	do.	250	02
Do.	May 15, 1915	306	High Line Canal, division 10, laterals.	do.	250	02

**PAVING, DRY.**

				Square yards..	\$1.75	\$2.00	\$2.00
Montana, Milk River	Oct. 13, 1914	282	Nelson Reservoir, schedule 1	do.	1,080		
Do	do	283	Nelson Reservoir, schedule 2	do.	1,110		
Montana, Sun River	Dec. 8, 1914	283	Pishkun Reservoir Supply Canal	do.	150	1.75	2.00
Utah, Strawberry Valley	Nov. 16, 1914	284	High Line Canal, division 1	do.	180	.80	1.50
Do	do	284	High Line Canal, division 2	do.	100	1.00	1.10
Do	do	285	High Line Canal, division 3	do.	100	1.00	1.50
Montana, Flathead (Indian)	Dec. 22, 1914	288	Pablo lateral, 31 A, schedule 1	do.	400	.88	2.00
Do	do	288	Pablo lateral, 31 A, schedule 2	do.	240	.88	1.00
Do	do	288	Pablo lateral, 31 A, schedule 3	do.	1,000	1.70	1.75
Do	do	288	Pablo lateral, A, schedule 3	do.	700	1.30	1.75

**Price fixed in schedule.**

## Unit bids and contract prices on formal specifications—Continued.

## PAVING, DRY—Continued.

State and project.	Date opening bids.	Specification number.	Feature or description.	Unit.	Quantity.	Bids per unit.		Contract price.
						Lowest.	Next.	
Utah, Strawberry Valley.	Feb. 3, 1915	295	High Line Canal, division 4	Square yards.	100	\$1.00	\$1.35	\$1.35
Do.	Feb. 24, 1915	296	High Line Canal, lateral 30.	do.	50	1.50	1.50	1.50
Do.	Mar. 10, 1915	298	High Line Canal, laterals 32 and 33.	do.	75	1.25	1.50	1.50
Do.	Apr. 3, 1915	299	High Line Canal, division 7, laterals 1-19.	do.	165	1.75	2.00	2.00
Montana, Milk River.	Do.	300	St. Mary Canal, check control (18 inches).	do.	185	No bid.	No bid.	No bid.
Do.	Do.	300	St. Mary Canal, check control (18 inches).	do.	185	No bid.	No bid.	No bid.
Do.	Do.	300	St. Mary Canal, sluice gate (18 inches).	do.	40	No bid.	No bid.	No bid.
Do.	Do.	300	St. Mary Canal, sluice gate (18 inches).	do.	40	No bid.	No bid.	No bid.
Do.	Do.	300	St. Mary Canal, pipe culverts (18 inches).	do.	40	No bid.	No bid.	No bid.
Utah, Strawberry Valley.	Mar. 19, 1915	303	High Line Canal, division 8, lateral 20.	do.	10	1.50	3.00	3.00
Do.	June 18, 1915	305	High Line Canal, division 9, laterals.	do.	150	2.50	2.50	2.50
Do.	July 15, 1915	306	High Line Canal, division 10, laterals.	do.	100	1.50	2.50	3.00

## PAVING, GROUTED.

Arizona, Salt River.	Aug. 17, 1914	278	Cove Creek cut-off, Arizona Canal.	Square yards.	107	\$1.93	\$2.00	\$1.90
Do.	Aug. 24, 1914	280	Wallace Feeder Canal.	do.	80	1.50	1.93	3.00
Montana, Flathead (Indian).	Dec. 22, 1914	288	Pablo laterals 31A (18 inches), schedule 1.	do.	620	1.50	2.60	3.00
Do.	Do.	288	Pablo laterals 31A (12 inches), schedule 1.	do.	160	1.00	1.90	2.50
Do.	Do.	288	Pablo laterals 31A (12 inches), schedule 2.	do.	1,575	2.00	2.25	2.25
Do.	Do.	288	Pablo laterals A (18 inches), schedule 3.	do.	760	2.00	2.25	2.25
Do.	Do.	288	Pablo laterals A (12 inches), schedule 3.	do.	160	1.50	2.00	2.00
Montana, Sun River.	July 1, 1915	292	Greenfields distribution system.	do.	960	.90	1.50	.90
Do.	Do.	292	Schedule 6, laterals, Greenfields and South Canals.	do.	90	1.00	2.25	1.00
Do.	Do.	292	Schedule 7, laterals, Greenfields and Sun River Slope.	do.	320	1.00	2.25	1.00
Do.	Do.	292	Schedule 8, laterals, Greenfields Canal.	do.	165	.90	2.25	.90
Montana, Milk River.	Apr. 30, 1915	300	St. Mary Canal, check control.	do.	165	No bid.	No bid.	No bid.
Do.	Do.	300	St. Mary Canal, control gate.	do.	330	No bid.	No bid.	No bid.
Do.	Do.	300	St. Mary Canal, sluice gate.	do.	60	No bid.	No bid.	No bid.
Do.	Do.	300	St. Mary Canal, pipe culverts.	do.	60	No bid.	No bid.	No bid.
Do.	Do.	300	St. Mary Canal, culvert, station 253.	do.	60	No bid.	No bid.	No bid.

## PIPE, CAST-IRON, LAYING.

Utah, Strawberry Valley.....	Feb. 3, 1915	295	High Line Canal, division 4, 36 inches diameter.....	Linear feet.....	36	\$0.45	\$0.90	\$1.50
Do.....	May 19, 1915	303	High Line Canal, division 8, lateral 20, 18 inches diameter.....	.....do.....	36	.80	.50	.50
Do.....	.....do.....	303	High Line Canal, division 8, lateral 20, 24 inches diameter.....	.....do.....	276	.60	.65	.80
Do.....	.....do.....	303	High Line Canal, division 8, lateral 20, 30 inches diameter.....	.....do.....	36	.70	1.00	1.00
Do.....	.....do.....	303	High Line Canal, division 8, lateral 20, 36 inches diameter.....	.....do.....	48	.80	1.50	1.80
Do.....	June 16, 1915	305	High Line Canal, division 9, laterals, 18 inches diameter.....	.....do.....	36	.60	1.50	.80

## PIPE, CONCRETE AND VITRIFIED, LAYING.

Arizona, Salt River.....	Aug. 21, 1914	280	Wallace Feeder Canal, concrete.....	Linear feet.....	160	\$0.22	\$0.25	\$0.65
Utah, Strawberry Valley.....	Nov. 16, 1914	284	High Line Canal, division 1, 6 inches.....	.....do.....	650	.07	.10	.10
Do.....	.....do.....	284	High Line Canal, division 1, 12 inches.....	.....do.....	100	.12	.15	.20
Do.....	.....do.....	284	High Line Canal, division 1, 18 inches.....	.....do.....	22	.20	.25	.40
Do.....	.....do.....	284	High Line Canal, division 2, 6 inches.....	.....do.....	50	.06	.10	.15
Do.....	.....do.....	284	High Line Canal, division 2, 12 inches.....	.....do.....	200	.13	.14	.15
Do.....	.....do.....	284	High Line Canal, division 2, 18 inches.....	.....do.....	25	.20	.22	.20
Do.....	.....do.....	284	High Line Canal, division 3, 6 inches.....	.....do.....	400	.05	.07	.10
Do.....	.....do.....	284	High Line Canal, division 3, 12 inches.....	.....do.....	100	.10	.12	.15
Do.....	.....do.....	284	High Line Canal, division 3, 18 inches.....	.....do.....	125	.15	.20	.30
Montana, Sun River.....	July 1, 1915	292	Laterals, Greenfields and South Canals, 6-inch drain.....	.....do.....	2,450	.12	.20	.12
Do.....	.....do.....	292	Laterals, Greenfields and Sun River Canals, 12-inch vitrified.....	.....do.....	38	.50	.70	.75
Do.....	.....do.....	292	Laterals, Greenfields Canal, 4-inch drain.....	.....do.....	80	.50	.70	.75
Do.....	.....do.....	292	High Line Canal, division 4, 6-inch vitrified.....	.....do.....	400	.18	.50	.50
Utah, Strawberry Valley.....	Feb. 3, 1915	293	High Line Canal, division 4, 12-inch vitrified.....	.....do.....	200	.18	.50	.50
Do.....	.....do.....	293	High Line Canal, division 4, 18-inch vitrified.....	.....do.....	100	.15	.20	.15
Do.....	.....do.....	293	High Line Canal, division 4, 24-inch vitrified.....	.....do.....	50	.20	.25	.25
Do.....	.....do.....	293	High Line Canal, division 4, 36-inch vitrified.....	.....do.....	50	.30	.35	.40
Do.....	Feb. 24, 1915	294	High Line Canal, lateral 30, 12-inch vitrified.....	.....do.....	150	1.50	1.50	1.50
Do.....	.....do.....	294	High Line Canal, lateral 30, 18-inch vitrified.....	.....do.....	150	.15	.20	.20
Do.....	.....do.....	294	High Line Canal, lateral 30, 24-inch vitrified.....	.....do.....	325	.15	.20	.25
Do.....	.....do.....	294	High Line Canal, lateral 32 and 33, 12-inch vitrified.....	.....do.....	350	.15	.20	.25
Do.....	Mar. 10, 1915	298	High Line Canal, lateral 32 and 33, 18-inch vitrified.....	.....do.....	175	.20	.22	.30
Do.....	.....do.....	298	High Line Canal, lateral 32 and 33, 24-inch vitrified.....	.....do.....	425	.40	.50	.50
Do.....	.....do.....	298	High Line Canal, lateral 32 and 33, 24-inch vitrified.....	.....do.....	450	.40	.50	.50
Do.....	Apr. 8, 1915	299	High Line Canal, division 7, laterals 1-19, 12-inch vitrified.....	.....do.....	50	.20	.30	.20
Do.....	.....do.....	299	High Line Canal, division 7, laterals 1-19, 18-inch vitrified.....	.....do.....	300	.30	.40	.30
Do.....	.....do.....	299	High Line Canal, division 7, laterals 1-19, 24-inch vitrified.....	.....do.....	50	.50	.75	.50

## Unit bids and contract prices on formal specifications—Continued.

## PIPE, CONCRETE AND VITRIFIED, LAYING—Continued.

State and project.	Date opening bids.	Specification number.	Feature or description.	Unit.	Quantity.	Bids per unit.		Contract price.
						Lowest.	Next.	
Montana, Milk River.....	Apr. 30, 1915	300	St. Mary Canal, pipe culverts, 30 inches.....	Linear feet.....	650			No bid.
Do.....	.....do.....	300	St. Mary Canal, culvert, station 253.....	.....do.....	130			No bid.
Utah, Strawberry Valley.....	May 19, 1915	303	High Line Canal, division 8, lateral 20, 12-inch vitrified.....	.....do.....	50	\$0.25	\$0.30	\$0.30
Do.....	.....do.....	303	High Line Canal, division 8, lateral 20, 18-inch vitrified.....	.....do.....	375	.25	.30	.25
Do.....	.....do.....	303	High Line Canal, division 8, lateral 20, 24-inch vitrified.....	.....do.....	1,300	.25	.40	.25
Do.....	June 16, 1915	305	High Line Canal, division 9, laterals, 12 inches diameter.....	.....do.....	100	.25	.40	.25
Do.....	.....do.....	305	High Line Canal, division 9, laterals, 18 inches diameter.....	.....do.....	1,300	.30	.50	.30
Do.....	.....do.....	305	High Line Canal, division 9, laterals, 24 inches diameter.....	.....do.....	600	.40	.60	.40
Do.....	.....do.....	306	High Line Canal, division 10, laterals, 12 inches diameter.....	.....do.....	125	.20	.30	.30
Do.....	July 15, 1915	306	High Line Canal, division 10, laterals, 18 inches diameter.....	.....do.....	1,400	.35	.40	.40
Do.....	.....do.....	306	High Line Canal, division 10, laterals, 24 inches diameter.....	.....do.....	450	.50	.65	.50

## PIPE, CONCRETE, MANUFACTURING AND LAYING.

Montana, Flathead (Indian).....	Dec. 22, 1914	288	Pablo laterals 31A, 12-inch pipe.....	Linear feet.....	410	\$0.75	\$1.05	\$0.75
Do.....	.....do.....	288	Pablo laterals 31A, 18-inch pipe.....	.....do.....	220	1.20	1.39	1.20
Do.....	.....do.....	288	Pablo laterals 31A, 24-inch pipe.....	.....do.....	410	1.75	1.85	1.75
Do.....	.....do.....	288	Pablo laterals 31A, 30-inch pipe.....	.....do.....	300	3.00	4.45	3.00
Do.....	.....do.....	288	Pablo laterals A, 12-inch pipe.....	.....do.....	380	.35	.75	.75
Do.....	.....do.....	288	Pablo laterals A, 18-inch pipe.....	.....do.....	100	.50	1.39	1.40
Do.....	.....do.....	288	Pablo laterals A, 24-inch pipe.....	.....do.....	60	.70	1.92	2.00
Do.....	.....do.....	288	Pablo laterals A, 30-inch pipe.....	.....do.....	120	1.60	3.00	3.00
Do.....	.....do.....	288	Greenfields distribution system: Schedule 7, laterals, Greenfields and Sun River Canals, 18 inches.....	.....do.....	1,110	1.10	1.50	1.60
Montana, Sun River.....	July 1, 1915	292	Schedule 7, laterals, Greenfields Canal, 20 inches.....	.....do.....	250	1.25	1.75	2.00
Do.....	.....do.....	292	Schedule 7, laterals, Greenfields Canal, 20 inches.....	.....do.....	250	1.25	1.75	2.00

Do.....do.....	292	Schedule 7, laterals, Greenfields Canal, 24 inches.	190	1.50	2.00	2.50
Do.....do.....	292	Schedule 8, laterals, Greenfields Canal, 18 inches.	720	1.10	1.50	1.60
Do.....do.....	292	Schedule 8, laterals, Greenfields Canal, 20 inches.	500	1.25	1.75	2.00
Do.....do.....	292	Schedule 8, laterals, Greenfields Canal, 24 inches.	420	1.50	2.00	2.30
Do.....do.....	292	Schedule 9, laterals, Greenfields Canal, 18 inches.	960	1.10	1.50	1.75
Do.....do.....	292	Schedule 9, laterals, Greenfields Canal, 20 inches.	280	1.25	1.75	2.00
Do.....do.....	292	Schedule 9, laterals, Greenfields Canal, 24 inches.	660	1.50	2.00	2.25

## PIPE, CORRUGATED METAL, LAYING.

Montana, Sun River.....	July 1, 1915	Greenfields distribution system: Schedule 7 laterals, Greenfields and Sun River Canals, 18 inches.	450	\$0.25	\$0.45	\$0.50
Do.....do.....	292	Schedule 7 laterals, Greenfields and Sun River Canals, 30 inches.	144	.35	.60	.60
Do.....do.....	292	Schedule 7 laterals, Greenfields and Sun River Canals, 36 inches.	108	.40	.75	.80
Do.....do.....	292	Schedule 7 laterals, Greenfields and Sun River Canals, 42 inches.	90	.50	.90	1.00
Do.....do.....	292	Schedule 8, laterals, Greenfields Canal, 18 inches.	630	.25	.45	.50
Do.....do.....	292	Schedule 8, laterals, Greenfields Canal, 24 inches.	18	.30	.50	.60
Do.....do.....	292	Schedule 8, laterals, Greenfields Canal, 30 inches.	396	.35	.60	.60
Do.....do.....	292	Schedule 8, laterals, Greenfields Canal, 36 inches.	90	.40	.75	.80
Do.....do.....	292	Schedule 8, laterals, Greenfields Canal, 42 inches.	108	.50	.90	1.00
Do.....do.....	292	Schedule 9, laterals, Greenfields Canal, 18 and 20 inches.	594	.25	.45	.50
Do.....do.....	292	Schedule 9, laterals, Greenfields Canal, 24 inches.	72	.30	.50	.60
Do.....do.....	292	Schedule 9, laterals, Greenfields Canal, 30 inches.	162	.35	.60	.65
Do.....do.....	292	Schedule 9, laterals, Greenfields Canal, 36 inches.	270	.40	.75	.75
Do.....do.....	292	Schedule 9, laterals, Greenfields Canal, 42 inches.	90	.50	.90	1.00

## Unit bids and contract prices on formal specifications—Continued.

## PIPE, STEEL, RIVETED.

State and project.	Date opening bids.	Specification number.	Feature or description.	Unit.	Quantity.	Bids per unit.		Contract price.
						Lowest.	Next.	
Montana, Milk River.....	July 22, 1914	273	Item 1, St. Mary River Crossing, weight 553,467 pounds, 84 and 90 inches diameter (turnish).	Linear feet.....	1,782	\$11.031	\$11.345	\$18.000
Do.....	do.....	273	Item 2, Halls Coulee Crossing, weight 328,602 pounds, 6 feet 6 inches diameter (turnish).	do.....	1,514	7.235	7.349	11.100
Do.....	do.....	273	Item 3, erect item 1.....	do.....		12.550	30.800	30.800
Do.....	do.....	273	Item 4, erect item 2.....	do.....		10.130	19.000	19.000
Utah, Strawberry Valley.....	Apr. 8, 1915	299	High Line Canal, division 7, laterals 1-19, laying 14-inch No. 16 gauge, riveted steel in 20-foot lengths.	Linear feet.....	200	.25	.40	.25
Do.....	May 19, 1915	303	High Line Canal, division 8, lateral 20, laying 14-inch No. 16 gauge, riveted steel pipe.	do.....	100	.20	.25	.20
Do.....	June 16, 1915	305	High Line Canal, division 9, laterals, laying 14-inch No. 16 gauge, riveted steel pipe.	do.....	350	.25	.40	.25
Do.....	July 15, 1915	306	High Line Canal, division 10, laterals, laying 14-inch, No. 16 gauge.	do.....	160	.20	.25	.20

## PIPE, WOOD-STAVE, FURNISH, ERECT, AND PAINT.

South Dakota, Belle Fourche.....	July 30, 1914	275	Item 1, 60 inches diameter, Douglas fir.....	Linear feet.....	1,750	\$2.85	\$2.94	\$2.85
Nebraska-Wyoming, North Platte.....	do.....	275	Item 2, 24 inches diameter, Douglas fir.....	do.....	2,406	1.08	1.10	1.08
Colorado, Uncompaggre.....	do.....	275	Item 3, 32 inches diameter, Douglas fir.....	do.....	8,560	1.31	1.36	1.31

## PILES, ROUND, DELIVERED.

Wyoming, Snake River storage.....	July 22, 1914	274	Item 5, red fir, round 30-foot piles, piers.....	Number.....	18	\$3.75	\$9.20	.....
Do.....	do.....	274	Red fir, round 30-foot piles, west abutments.....	do.....	320	3.75	9.20	.....
Do.....	do.....	274	Item 23, red fir, 30 feet long, for pier shells.....	do.....	24	3.75	9.20	\$3.75
Do.....	do.....	274	Item 25, red fir, 30-foot approaches.....	do.....	400	3.75	9.20	.....
Do.....	do.....	274	Item 27, red fir, 30-foot abutments.....	do.....	200	3.75	9.20	3.75
Do.....	do.....	274	Item 29, alternate No. 25, 30 feet.....	do.....	80	3.75	9.20	3.75

## PIPES, ROUND, DRIVING.

Wyoming, Snake River storage.....	July 22, 1914	274	Item 13, in bridge pier shells.....	Linear feet.....	360	.....	.....
Do.....	do.....	274	Item 16, in west approach.....	do.....	6,400	.....	.....
Do.....	do.....	274	Item 35, in bridge pier shells.....	do.....	480	.....	\$0.65
Do.....	do.....	274	Item 36, in bridge approaches.....	do.....	8,000	.....	.....
Do.....	do.....	274	Item 39, in wing walls.....	do.....	4,000	.....	.35
Do.....	do.....	274	Item 43 (alternate item 36).....	do.....	1,800	.....	.50

## PUDDLING.

Montana, Milk River.....	Oct. 28, 1914	281	Dodson Canal at Dodson Bridge, schedule 1.....	Cubic yards.....	12,000	\$0.40	\$0.75	\$0.40
Do.....	do.....	281	Dodson Canal at Dodson Bridge, schedule 2.....	do.....	1,100	.50	1.00	.50
Do.....	do.....	283	Nelson Reservoir, schedule 2.....	do.....	1,600	.50	.50	.50
Montana, Flathead (Indian).....	Oct. 13, 1914	283	Pablo Lateral 31A, schedule 1.....	do.....	150	.55	.60	.60
Do.....	do.....	283	Pablo Lateral 31A, schedule 2.....	do.....	700	.55	.70	.75
Do.....	do.....	283	Pablo Lateral A, schedule 3.....	do.....	300	.55	.75	.75
Montana, Sun River.....	July 1, 1915	283	Greenfields distributing system: Schedule 6, structures Greenfields and South Canals.....	do.....	1,000	.10	.50	.10
Do.....	do.....	283	Schedule 7, structures Greenfields and Sun River Canals.....	do.....	1,900	.12	.50	.12
Do.....	do.....	282	Schedule 8, structure Greenfields Canal.....	do.....	1,700	.10	.50	.10
Do.....	do.....	282	Schedule 9, structure Greenfields Canal.....	do.....	1,900	.10	.50	.10
Montana, Milk River.....	Apr. 30, 1915	300	St. Mary Canal, check control.....	do.....	110	.....	.....	No bid.
Do.....	do.....	300	St. Mary Canal, control gate.....	do.....	110	.....	.....	No bid.
Do.....	do.....	300	St. Mary Canal, sluice gate.....	do.....	60	.....	.....	No bid.
Do.....	do.....	300	St. Mary Canal, pipe culvert.....	do.....	140	.....	.....	No bid.
Do.....	do.....	300	St. Mary Canal, culvert station 253.....	do.....	40	.....	.....	No bid.

## RIPRAP. (SEE ALSO ROCK FILL.)

Wyoming, Snake River storage.....	July 22, 1914	274	Bridge, item 12, around bridge piers.....	Cubic yards.....	450	\$2.00	\$4.00	.....
Do.....	do.....	274	Bridge, item 34, around bridge piers.....	do.....	600	2.00	4.00	\$4.00
Montana, Milk River.....	Oct. 28, 1914	281	Dodson Canal at Dodson Bridge, rock from canal.....	do.....	4,200	0.90	1.50	.80
Do.....	do.....	281	Dodson Canal at Dodson Bridge, rock borrowed.....	do.....	1,000	2.00	4.00	2.00
Do.....	Oct. 13, 1914	282	Nelson Reservoir, schedule 2.....	do.....	300	1.80	3.50	1.80



*Unit bids and contract prices on formal specifications—Continued.*  
**ROCK FILL (RIPRAP).**

State and project.	Date opening bids.	Specification number.	Feature or description.	Unit.	Quantity.	Bids per unit.		Contract price.
						Lowest.	Next.	
Wyoming, Snake River storage.	July 22, 1914	274	Item 41, wing walls, bridge.	Cubic yards.	450	\$2.00	\$2.00	\$2.00
Montana, Sun River.	Dec. 8, 1914	283	Fishkun Reservoir, Supply Canal.	do.	80	1.00	1.25	2.00
Utah, Strawberry Valley.	Nov. 16, 1914	284	High Line Canal, division 1.	do.	10	1.00	1.25	1.50
Do.	do.	284	High Line Canal, division 2.	do.	20	1.00	1.25	2.00
Do.	do.	284	High Line Canal, division 3.	do.	23	1.00	1.25	1.35
Do.	do.	284	High Line Canal, division 4.	do.	23	1.00	1.25	1.35
Do.	Feb. 3, 1915	286	High Line Canal, lateral 3.	do.	45	1.00	1.25	2.00
Do.	Feb. 18, 1915	286	High Line Canal, lateral 3, and 33.	do.	50	1.00	1.25	2.00
Do.	Mar. 18, 1915	286	High Line Canal, division 7, laterals 1 to 19.	do.	100	1.25	1.50	1.50
Utah, Strawberry Valley.	Apr. 18, 1915	289	High Line Canal, division 8, lateral 20.	do.	100	1.25	1.50	2.50
Do.	May 18, 1915	303	High Line Canal, division 8, laterals.	do.	100	1.50	2.50	1.50
Do.	June 18, 1915	303	High Line Canal, division 10, laterals.	do.	100	2.00	3.00	2.00
Do.	July 15, 1915	306	High Line Canal, division 10, laterals.	do.	100	2.00	3.00	2.00

**ROLLER DAM (STEEL CREST AND HOISTS).**

Colorado, Grand Valley.	Nov. 19, 1914	285	Steel crest, Grand River Dam, roller 6, 10 feet 3 inches, 70 feet long; roller 1, 15 feet 4 inches, 60 feet long; total weight 500,000 pounds.	Pounds.	560,000	\$0.0255	\$0.0294	\$0.0255
Do.	Dec. 10, 1914	286	Hoists for 70-foot rollers, total weight 70,000 pounds, No. 6.	Number.	6	825.00	850.00	825.00
Do.	do.	294	Hoist (44-ton) for 60-foot roller, weight estimated 20,000 pounds, item (lump sum).	do.	1	1,600.00	1,982.00	1,600.00

**STEEL, REINFORCING BARS, PLACING.**

Wyoming, Snake River storage.	July 22, 1914	274	Item 15, in place, east abutment.	Pounds.	57,000	\$0.054	\$0.06	.....
Montana, Milk River.	Oct. 13, 1914	282	Nelson Reservoir, placing.	do.	245,000	.015	.018	\$0.018
Montana, Sun River.	Dec. 8, 1914	283	Fishkun Reservoir, Supply Canal.	do.	245,000	.011	.0124	.....
Montana, Flathead (Indian).	Dec. 22, 1914	288	Pablo Lateral 31 A, schedule 1.	do.	22,800	.02	.03	.02
Do.	do.	288	Pablo Lateral 31 A, schedule 2.	do.	28,000	.02	.03	.02
Do.	do.	288	Pablo Lateral A, schedule 3.	do.	13,000	.02	.03	.02
Montana, Sun River.	July 1, 1915	292	Greenfields distribution system.	do.	107,000	.01	.014	.01
Do.	do.	293	Schedule 6, laterals, Greenfields and South canals.	do.	.....	.....	.....	.....

Do.....	do.....	292	Schedule 7, laterals, Greenfields and Sun River slope canals.....	do.....	52,000	.01	.015	.01
Do.....	do.....	292	Schedule 8, laterals, Greenfields Canal.....	do.....	56,000	.01	.015	.01
Do.....	do.....	292	Schedule 9, laterals, Greenfields Canal.....	do.....	57,000	.01	.015	.01
Utah, Strawberry Valley.....	Feb. 3, 1915	295	High Line Canal, lateral 4.....	do.....	185,000	.005	.015	.005
Do.....	Feb. 24, 1915	296	High Line Canal, lateral 30.....	do.....	28,000	.01	.015	.01
Do.....	Mar. 10, 1915	298	High Line Canal, laterals 32 and 33.....	do.....	35,000	.01	.015	.01
Do.....	Apr. 8, 1915	299	High Line Canal, division 7, laterals 1 to 19.....	do.....	35,000	.01	.015	.01
Montana, Milk River.....	Apr. 30, 1915	300	St. Mary Canal, check control.....	do.....	9,000	No bid.	No bid.	No bid.
Do.....	do.....	300	St. Mary Canal, control gate.....	do.....	9,000	No bid.	No bid.	No bid.
Do.....	do.....	300	St. Mary Canal, sluice gate.....	do.....	18,000	No bid.	No bid.	No bid.
Do.....	do.....	300	St. Mary Canal, pipe culverts.....	do.....	2,750	No bid.	No bid.	No bid.
Do.....	do.....	300	St. Mary Canal, culvert station 253.....	do.....	50,000	.01	.015	.015
Utah, Straw Valley.....	May 10, 1915	302	High Line Canal, division 8, lateral 20.....	do.....	35,000	.02	.025	.02
Do.....	June 18, 1915	303	High Line Canal, division 9, laterals.....	do.....	35,000	.02	.025	.02
Do.....	July 15, 1915	306	High Line Canal, division 10, laterals.....	do.....	50,000	.015	.02	.02

## STEEL, STRUCTURAL, ERECTING.

Montana, Flathead (Indian).....	Dec. 23, 1914	288	Pablo laterals, 31A, and sublaterals.....	Pound.....	200	\$0.03	\$0.06	\$0.03
Montana, Sun River.....	July 1, 1915	292	Laterals, Greenfields and South Canals.....	do.....	600	.0125	.025	No bid.
Montana, Milk River.....	Apr. 30, 1915	300	St. Mary Canal, check control.....	do.....	11,650	.....	.....	No bid.
Do.....	do.....	300	St. Mary Canal, control gates.....	do.....	11,700	.....	.....	No bid.
Do.....	do.....	300	St. Mary Canal, sluice gates.....	do.....	5,650	.....	.....	No bid.

## TUNNEL.

Utah, Strawberry Valley.....	Nov. 16, 1914	284	High Line Canal, division 1.....	Linear feet.....	230	\$24.70	\$25.50	\$24.70
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## TURBINES.

Arizona, Salt River.....	July 14, 1914	271	Item 1, 196,500 pounds.....	Number.....	1	\$18,185	\$28,060	\$18,185
Do.....	do.....	271	Item 1A, with butterfly valve.....	do.....	1	20,055	27,340	.....

## VALVES, NEEDLE.

Arizona, Salt River.....	May 12, 1915	302	Two semicircular needle valve outlets, f. o. b. plant, approximate total, each, 86,000 pounds, for Roosevelt Reservoir dam, lump sum.	Lump sum.....	.....	\$6,240	\$6,466	\$6,240
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## ENGINEERING DATA FOR PROJECTS ON COMPLETION.

*Engineering data for projects when completed.*

## RESERVOIRS.

Projects.	Name.	Area.	Capacity.	Spillways.	
				Length.	Elevation above stream bed.
		<i>Acres.</i>	<i>Acres.</i>	<i>Feet.</i>	<i>Feet.</i>
Arizona: Salt River.....	Roosevelt.....	16,832	1,367,300	400	225
California: Orland.....	East Park.....	1,860	51,000	415	88
Colorado: Uncompahgre Valley.....	Taylor Park.....	2,280	106,000	125	150
Idaho:					
Boise.....	Deer Flat.....	9,835	177,640	None.	.....
Do.....	Arrowrock.....	2,860	244,300	402	247
Minidoka.....	Lake Walcott.....	11,350	150,000	2,385	42
Do.....	Jackson Lake.....	25,530	789,000	100	41
Montana:					
Blackfoot (Indian).....	Two Medicine Lake.....	854	16,000	66	254
Do.....	Spring Lake.....	1,400	29,000	50	45
Do.....	Four Horns.....	1,867	60,640	50	57
Flathead (Indian).....	Big Draw.....	901	9,330	100	25
Do.....	Dry Fork.....	160	3,200	.....	30
Do.....	.....	250	1,915	100	25
Do.....	Flathead Lake.....	107,000	1,800,000	1,000	180
Do.....	Hubbart.....	480	20,000	50	108
Do.....	Klickinghorse.....	675	6,800	.....	22
Do.....	Little Bitter Root Lake.....	3,000	6,000	20	3
Do.....	Lower Crow Creek.....	300	9,485	100	82
Do.....	McConnell.....	100	2,000	.....	40
Do.....	McDonald Lake.....	220	10,600	200	51
Do.....	Mission.....	300	8,300	100	74
Do.....	Nine Pipe.....	1,630	15,100	(*)	230
Do.....	Pablo.....	2,100	22,600	(*)	236
Do.....	Folsom.....	70	1,700	.....	80
Do.....	St. Marys Lake.....	300	25,000	50	52
Do.....	Twinn.....	70	937	.....	25
Fort Peck (Indian).....	Little Porcupine.....	390	3,900	.....	.....
Do.....	Big Porcupine.....	750	9,400	.....	.....
Do.....	Poplar River.....	2,600	31,000	.....	.....
Do.....	Wolf Creek.....	350	4,550	.....	.....
Do.....	Smoke Creek.....	300	5,300	.....	.....
Milk River.....	St. Mary Lakes.....	6,910	124,000	500	20
Do.....	Sherburne Lakes.....	2,000	78,000	200	70
Do.....	Nelson Reservoir.....	6,021	132,670	None.	.....
Do.....	Point of Rocks.....	.....	830	.....	.....
Sun River.....	Willow Creek.....	2,696	86,000	200	100
Do.....	Sun River Storage.....	3,540	269,000	580	321
Do.....	Fishkum Reservoir.....	1,542	45,700	Under control.	.....
Do.....	Muddy Creek.....	1,828	33,000	.....	80
Do.....	Benton Lake.....	9,300	144,000	Under control.	.....
Nebraska-Wyoming:					
North Platte.....	Pathfinder.....	22,700	1,070,000	660	184
Do.....	Reservoir No. 1, Lake Alice.....	900	11,400	100	18
Do.....	Lake Minstare.....	2,240	67,025	100	55
Nevada:					
Truckee-Carson.....	Lake Tahoe.....	125,000	750,000	85	6
Do.....	Alkali Flat.....	8,500	88,000	.....	.....
Do.....	Lahontan.....	12,000	290,000	500	112
New Mexico:					
Carlsbad.....	Avslon.....	970	7,000	1,000	21
Do.....	McMillan.....	6,250	70,000	2,700	23-26
Hondo.....	Hondo.....	1,910	40,000	None.	.....
New Mexico-Texas: Rio Grande.....	Elephant Butte.....	40,080	2,627,700	300	193
Oklahoma: Lawton.....	Lake Lawtonka.....	1,080	14,000	257	50
Oregon: Umatilla.....	Cold Springs.....	1,500	50,000	330	90
Oregon-California:					
Klamath.....	Upper Klamath Lake.....	60,000	264,000	None.	.....
Do.....	Clear Lake.....	25,000	462,000	357	24
South Dakota: Belle Fourche.....	Belle Fourche.....	8,010	203,770	314	100
Do.....	Nine Mile.....	150	2,500	20	20
Utah: Strawberry Valley.....	Strawberry Valley.....	8,200	278,000	60	60
Washington:					
Okanogan.....	Salmon Lake.....	200	2,600	None.	.....
Do.....	Conconully.....	460	13,000	180	55

\* 53,500 acre-feet only available; above fixed crest of spillway.

\* No spillways; drainage limited; elevation is that of water surface.

*Engineering data for projects when completed—Continued.*

## RESERVOIRS—Continued.

Projects.	Name.	Area.	Capacity.	Spillways.	
				Length.	Elevation above stream bed.
Washington—Continued.		<i>Acres.</i>	<i>Acres.</i>	<i>Feet.</i>	<i>Feet.</i>
Yakima.....	Bumping Lake.....	1,350	34,000	235	38
Do.....	Lake Clealum.....	4,680	501,000	680	112
Do.....	Lake Kachess.....	4,800	210,000	250	53
Do.....	McAllister Meadow.....	1,800	185,000	315	183
Do.....	Lake Keechelus.....	2,550	152,000	300	60
Do.....	Clear Creek.....	126	1,700	210	35
Wyoming:					
Shoshone.....	Shoshone <sup>1</sup> .....	6,600	470,000	300	233
Do.....	Ralston.....	200	2,100		
Total.....		577,803	13,774,995		

## STORAGE DAMS.

Projects.	Name.	Type.	Maximum height.	Crest length.	Volume.
			<i>Feet.</i>	<i>Feet.</i>	<i>Cubic yds.</i>
Arizona: Salt River..	Roosevelt <sup>2</sup> .....	Rubble masonry arch, gravity.	280	1,125	342,325
California: Orland...	East Park <sup>2</sup> .....	Concrete arch, gravity.....	139	250	12,200
Colorado:					
Uncompahgre Valley.	Taylor Park.....	Undetermined.....	200	(*)	(*)
Idaho:					
Boise.....	Upper Deer Flat <sup>2</sup> .....	Earth fill.....	70	4,000	1,190,275
Do.....	Lower Deer Flat <sup>2</sup> .....	do.....	40	7,200	1,207,668
Do.....	Deer Flat Forest <sup>2</sup> .....	do.....	16	950	22,500
Do.....	Arrowrock <sup>4</sup> .....	Rubble concrete arch, gravity.	349	1,100	585,130
Minnesota:					
Mimdoka.....	Mimdoka <sup>2</sup> .....	Rockfill, concrete core.....	86	937	242,500
Do.....	Jackson Lake <sup>4</sup> .....	Massive concrete gate section and earth fill.	67	5,000	320,000
Montana:					
Blackfoot(Ind.)..	Two Medicine <sup>2</sup> .....	Earth embankment.....	36	900	28,600
Do.....	Spring Lake.....	do.....	50	1,500	75,000
Do.....	Four Horns.....	do.....	62	2,225	149,000
Flathead(Ind.)..	Big Draw.....	Earth.....	35	3,600	137,000
Do.....	Dog Lake.....	Loose rock and earth.....	35	2,250	67,900
Do.....	Dry Fork.....	Earth.....	33	1,860	130,000
Do.....	Newell.....	Concrete.....	170	850	100,000
Do.....	Hubbart.....	Loose rock and earth.....	118	450	302,000
Do.....	Kickinghorse.....	Earth.....	31	3,700	181,000
Do.....	Little Bitter Root.....	do.....	10	300	4,000
Do.....	Lower Crow Creek.....	do.....	92	860	330,000
Do.....	McConnell.....	do.....	45	1,130	71,000
Do.....	McDonald Lake.....	Loose rock and earth.....	57	1,500	214,000
Do.....	Mission.....	do.....	80	2,500	346,000
Do.....	Ninepipe <sup>2</sup> .....	Earth.....	38	2,180	162,000
Do.....	Pablo <sup>4</sup> .....	do.....	46	14,000	1,028,000
Do.....	Polson.....	do.....	85	1,100	170,000
Do.....	St. Marys Lake.....	Loose rock and earth.....	58	2,200	140,000
Do.....	Twin.....	Earth.....	30	1,600	46,000
Fort Peck(Ind.)..	Little Porcupine <sup>2</sup> .....	Earth and brush mattress.....			43,400
Do.....	Big Porcupine.....	Earth fill.....			227,000
Do.....	Poplar River.....	do.....			830,000
Do.....	Wolf Creek.....	do.....			85,300
Do.....	Smoke Creek.....	do.....			75,600

<sup>1</sup> Capacity to top fixed concrete crest, 456,000 acre-feet; flash boards, 2 feet; increased storage, about 14,000 acre-feet.

<sup>2</sup> Completed.

<sup>3</sup> Not designed.

<sup>4</sup> Under construction.

<sup>5</sup> First development, 64,191; completed for 5,000 acre-feet.

<sup>6</sup> First development, 153,750; completed for 5,000 acre-feet when paved; now paved for 3,000 acre-feet.

*Engineering data for projects when completed—Continued.*

## STORAGE DAMS—Continued.

Projects.	Name.	Type.	Maximum height.	Crest length.	Volume.
			<i>Feet.</i>	<i>Feet.</i>	<i>Cubic yds.</i>
Montana—Contd.					
Milk River.....	St. Mary Lakes.....	Earth embankment.....	30	2,000	135,000
Do.....	Sherburne Lakes.....	do.....	78	850	215,000
Do.....	Nelson Reservoir.....	do.....	38	20,730	1,016,000
Do.....	Point of Rocks.....	do.....			
Sun River.....	Willow Creek <sup>1</sup> .....	Earth fill.....	110	1,045	452,000
Do.....	Sun River Storage.....	Masonry.....	329	989	296,060
Do.....	Pishkun.....	Earth fill.....	48	8,600	444,000
Do.....	Muddy Creek.....	do.....	90	800	440,000
Do.....	Benton Lake.....	do.....	40	240	12,000
Nebraska-Wyoming:					
North Platte.....	Pathfinder <sup>2</sup> .....	Broken range masonry arch..	218	432	60,210
Do.....	Pathfinder Dike <sup>2</sup> .....	Earth fill.....	40	1,650	152,000
Do.....	Dam No. 1 <sup>2</sup> .....	do.....	30	3,100	240,000
Do.....	Dam No. 14 <sup>2</sup> .....	do.....	23	2,550	119,000
Do.....	Mfnatare <sup>2</sup> .....	do.....	65	3,700	570,000
Nevada:					
Truckee-Carson..	Lake Tahoe <sup>2</sup> .....	Concrete sluiceway regulator	14	109	425
Do.....	Alkali Flat.....	Not designed.....			
Do.....	Lahontan <sup>2</sup> .....	Earth and gravel fill with concrete spillways.	124	1,400	770,000
New Mexico:					
Carlsbad.....	Avalon <sup>2</sup> .....	Earth and rock fill, concrete core.	50	1,380	168,773
Do.....	McMillan <sup>2</sup> .....	Earth and rock fill.....	55	1,686	150,744
Hondo.....	Hondo <sup>2</sup> .....	Earth embankments.....	25	17,371	639,993
New Mexico-Texas:					
Rio Grande.....	Elephant Butte <sup>2</sup> .....	Rubble concrete gravity, straight structure.	300	1,250	610,000
Do.....	Elephant Butte Dike <sup>4</sup> .....	Earth fill.....	42	1,900	164,660
Oklahoma: Lawton.	Medicine Bluff <sup>2</sup> .....	Rubble masonry.....	55	357	9,500
Oregon: Umatilla.....	Cold Springs <sup>2</sup> .....	Earth fill.....	98	3,800	789,500
Oregon-California:	Clear Lake <sup>2</sup> .....	Rock fill.....	33	790	56,600
Klamath.....					
South Dakota:					
Belle Fourche.....	Belle Fourche <sup>2</sup> .....	Earth fill.....	115	6,200	1,600,000
Do.....	Nine Mile.....	do.....	28	1,400	50,800
Utah:					
Strawberry Valley.	Indian Creek Dike <sup>2</sup> .....	Earth fill and reinforced concrete core.	37	1,311	101,107
Do.....	Strawberry <sup>2</sup> .....	do.....	72	488	108,415
Washington:					
Okanogan.....	Salmon Lake <sup>2</sup> .....	Concrete headworks.....			
Do.....	Conconully <sup>2</sup> .....	Hydraulic earth fill.....	64	1,000	336,000
Yakima.....	Bumping Lake <sup>2</sup> .....	Earth fill.....	45	3,425	229,832
Do.....	Lake Clealum.....	do.....	125	1,150	617,000
Do.....	Lake Kachess <sup>2</sup> .....	Earth and gravel fill.....	63	1,400	182,150
Do.....	McAllister Meadow.....	Earth and rock fill.....	200	950	1,200,000
Do.....	Lake Keechelus <sup>4</sup> .....	Earth and gravel fill.....	70	6,500	522,000
Do.....	Clear Creek <sup>2</sup> .....	Single concrete arch.....	63	210	2,516
Wyoming:					
Shoshone.....	Shoshone <sup>2</sup> .....	Rubble concrete arch.....	328	200	78,576
Do.....	Ralston <sup>2</sup> .....	Earth fill.....	50	150	24,740
Total.....					21,441,487

## DIVERSION DAMS.

Projects.	Name.	Type.	Maximum height.	Length, weir.	Volume.
			<i>Feet.</i>	<i>Feet.</i>	<i>Cubic yds.</i>
Arizona:					
Salt River.....	Granite Reef <sup>2</sup> .....	Rubble concrete weir.....	38	1,000	40,000
Do.....	Power Canal <sup>2</sup> .....	do.....	12½	400	4,800
Do.....	Joint Head <sup>2</sup> .....	Concrete weir.....	10	600	1,740
Arizona-California: Yuma	Laguna <sup>2</sup> .....	Indian weir, concrete and rock fill. <sup>7</sup>	40	4,780	441,733

<sup>1</sup> Completed to height of 70 feet.<sup>2</sup> Completed.<sup>3</sup> Elephant Butte Dam 92.7 per cent completed June 30, 1915.<sup>4</sup> Under construction.<sup>5</sup> Lake Kachess Dam 98 per cent completed June 30, 1915.<sup>6</sup> Lake Keechelus Dam 60.5 per cent completed June 30, 1915.<sup>7</sup> Area formed by Laguna diversion dam, 6,400 acres.

*Engineering data for projects when completed—Continued.*

## DIVERSION DAMS—Continued.

Projects.	Name.	Type.	Maximum height.	Length, weir.	Volume.
<b>California:</b>			<i>Feet.</i>	<i>Feet.</i>	<i>Cubic yds.</i>
Orland.....	Miller Buttes <sup>1</sup> .....	Concrete on piling.....	20	900	900
Do.....	North Side <sup>1</sup> .....	Concrete weir, with removable timber crest.....	8	360	270
Do.....	East Park Feed Canal <sup>1</sup> .....	Concrete arch.....	44	154	1,371
<b>Colorado:</b>					
Grand Valley.....	Diversion <sup>1</sup> .....	Masonry ogee weir with roller crest 10 to 15 feet high.....	24	546	17,195
Uncompahgre Valley.....	Gunnison <sup>2</sup> .....	Crib and rock fill and movable flashboards.....	11½	237	3,200
Do.....	Montrose and Delta <sup>1</sup> .....	Movable flashboard weir.....	6.8	68½	.....
Do.....	Loutsenhizer <sup>1</sup> .....	Pile and timber weir.....	.....	100	.....
Do.....	Selig <sup>1</sup> .....	Movable flashboard weir.....	6	95½	.....
Do.....	Ironstone.....	Not designed.....	.....	.....	.....
Do.....	East Canal <sup>1</sup> .....	Movable flashboard weir.....	( <sup>3</sup> )	72	.....
Do.....	Garnet.....	Not designed.....	.....	.....	.....
<b>Idaho:</b>					
Boise.....	Boise River <sup>1</sup> .....	Rubble concrete weir.....	45	246	21,750
Minidoka.....	Minidoka <sup>1</sup> .....	Combined diversion and storage dam. (See Storage.).....	.....	.....	.....
<b>Montana:</b>					
Blackfeet (Indian).....	Two Medicine <sup>1</sup> .....	Brush and rock.....	4	185	175
Do.....	Blacktail <sup>1</sup> .....	Concrete.....	14	54	299
Do.....	Badger Birch and Cut Bank.....	Not yet designed.....	.....	.....	.....
Flathead (Indian).....	Jocko River.....	Log crib, rock filled <sup>4</sup> .....	.....	.....	.....
Do.....	Little Bitter Root.....	do.....	.....	.....	.....
Do.....	Mud Creek <sup>1</sup> .....	Concrete.....	12	18	116
Do.....	Crow Creek <sup>1</sup> .....	do.....	13	82	380
Do.....	Post Creek—Kick-Inghorse <sup>1</sup> .....	Log crib, rock filled.....	7	110	1,500
Do.....	Post Creek—Pablo Feeder.....	do <sup>5</sup> .....	.....	.....	.....
Do.....	Mission Creek <sup>1</sup> .....	Log apron.....	3	80	.....
Do.....	Dry Creek.....	Log crib, rock filled <sup>4</sup> .....	.....	.....	.....
Do.....	Finley Creek.....	do.....	.....	.....	.....
Do.....	Agency Creek.....	do.....	.....	.....	.....
Do.....	Big Knife Creek <sup>1</sup> .....	Concrete.....	5	6	25
Do.....	Valley Creek.....	Log crib, rock filled <sup>4</sup> .....	.....	.....	.....
Do.....	Other small creeks.....	do.....	.....	.....	.....
Fort Peck (Indian).....	Little Porcupine.....	Concrete weir on timber crib.....	4	150	.....
Do.....	Poplar River.....	do.....	4	300	.....
Do.....	Big Porcupine.....	do.....	6	150	.....
Milk River.....	Swift Current.....	Earth and timber crib.....	13	2,800	86,700
Do.....	St. Mary.....	Concrete.....	6.5	198	480
Do.....	Chinook.....	Reinforced concrete.....	20	250	3,400
Do.....	Dodson <sup>1</sup> .....	Timber crib, rock filled.....	25	319	12,000
Do.....	Vandalla <sup>6</sup> .....	Reinforced concrete.....	34	1,500	11,000
Sun River.....	Sun River <sup>1</sup> .....	Concrete masonry.....	132	220	6,200
Do.....	Deep Creek.....	Reinforced-concrete weir.....	12	100	500
<b>Montana-North Dakota:</b>					
Lower Yellowstone.....	Lower Yellowstone <sup>1</sup> .....	Rock-filled, timber weir.....	12	700	14,500
<b>Nebraska - Wyoming:</b>					
North Platte.....	Whalen <sup>1</sup> .....	Concrete weir.....	29	300	80,740
<b>Nevada:</b>					
Truckee-Carson.....	Truckee River <sup>1</sup> .....	16 concrete sluiceways.....	22	171	3,322
Do.....	Carson River <sup>1</sup> .....	23 concrete sluiceways.....	21	240	2,707
<b>New Mexico:</b>					
Carlsbad.....	Avalon <sup>1</sup> .....	Combined storage and diversion. (See Storage.).....	.....	.....	.....
Hondo.....	Hondo River <sup>1</sup> .....	Earth fill.....	20	100	3,700
<b>New Mexico-Texas: Rio Grande.</b>					
Do.....	Leasburg <sup>1</sup> .....	Rubble concrete weir.....	9	600	2,318
Do.....	Mesilla <sup>6</sup> .....	do.....	11.7	303	2,650
Do.....	Mexican <sup>7</sup> .....	Rubble masonry.....	4.7	320	.....
Do.....	Palomas.....	Not designed.....	.....	.....	.....
Do.....	Percha.....	do.....	.....	.....	.....
<b>Oklahoma: Lawton</b>	Medicine Bluff.....	Concrete weir.....	15	350	400

<sup>1</sup> Completed.<sup>2</sup> Completed except for installation of movable flashboards.<sup>3</sup> 6 feet and 6 feet 10 inches.<sup>4</sup> Length, including logway.<sup>5</sup> Not yet designed.<sup>6</sup> Under construction.<sup>7</sup> Constructed by Mexican authorities and used jointly.

*Engineering data for projects when completed—Continued.*

## DIVERSION DAMS—Continued.

Projects.	Name.	Type.	Maximum height.	Length, weir.	Volume.
Oregon:			<i>Feet.</i>	<i>Feet.</i>	<i>Cubic yds.</i>
Umatilla.....	Feed Canal (Echo).....	Concrete weir arch.....	24	400	296
Do.....	Three-Mile Falls <sup>1</sup> .....	Concrete multiple arch.....	24	935	4,160
Oregon-California: Klamath.....	Lost River <sup>1</sup> .....	Hollow reinforced concrete.....	40	290	5,550
South Dakota: Belle Fourche.....	Diversion <sup>1</sup> .....	Concrete weir.....	23	400	12,149
Utah: Strawberry Valley.....	Spanish Fork.....	Reinforced-concrete weir.....	16	70	1,261
Washington:					
Okanogan.....	Salmon Creek <sup>1</sup> .....	Concrete weir.....	44	50	132
Yakima.....	Sunnyside <sup>1</sup> .....	Concrete oggee weir.....	84	500	2,291
Do.....	Tieton <sup>1</sup> .....	Concrete and rock-filled crib.....	3	110	334
Wyoming: Shoshone.....	Corbett <sup>1</sup> .....	Reinforced-concrete weir.....	18	400	4,951
Total.....					797,135

CANALS.<sup>2</sup>

Projects.	Principal canals.			Mileage, with capacity in second-feet.				
	Name.	Maximum capacity.	Length.	Over 800.	301-800.	50-300.	Less than 50.	Total.
Arizona:		<i>Sec.-ft.</i>	<i>Miles.</i>					
Salt River.....	Power <sup>1</sup> .....	225	19					
Do.....	Arizona <sup>1</sup> .....	2,000	22	32	71	78	566	747
Do.....	South <sup>1</sup> .....	1,200	2					
Do.....	Consolidated <sup>1</sup> .....	1,000	7½					
Arizona-Cal.: Yuma.....	Main <sup>1</sup> .....	1,700	12	17	17	110	260	404
Do.....	West Main.....	520	23					
Do.....	East Main.....	880	24½					
California:								
Orland.....	East Park Feed <sup>1</sup> .....	250	7			7		7
Do.....	North Main <sup>1</sup> .....	80	4.5			8	32	40
Do.....	South Main <sup>1</sup> .....	225	9.1			23	75	98
Colorado:								
Grand Valley.....	Main <sup>1</sup> .....	1,425	62	5	39	21	232	297
Uncompahgre.....	South <sup>1</sup> .....	1,300	12	12		1	50	63
Do.....	West <sup>1</sup> .....	1,120	22			14	27	41
Do.....	Montrose and Delta <sup>1</sup> .....	450	32		16	37	30	133
Do.....	Loutsenhizer <sup>1</sup> .....	125	15			8	22	30
Do.....	Selig <sup>1</sup> .....	300	20		4	17	70	91
Do.....	Ironstone.....	350	12		5	13	50	68
Do.....	East <sup>1</sup> .....	325	11		4	10	50	64
Do.....	Garnet <sup>1</sup> .....	50	10			8	4	12
Idaho:								
Boise.....	Main South <sup>1</sup> .....	2,500	34	40	57	165	788	1,060
Do.....	Mora <sup>1</sup> .....	915	56					
Do.....	Deer Flat, Low Line <sup>1</sup> .....	780	37					
Minidoka.....	North Side <sup>1</sup> .....	1,450	8	21	23	106	600	750
Do.....	South Side <sup>1</sup> .....	950	13					
Kansas: Garden City.....	Main <sup>1</sup> .....	115	4			2	2	4
Montana:								
Blackfeet (Indian).....	Two Medicine.....	350	25	40	144	600	784	
Do.....	Fisher.....	370	30					
Do.....	Cutbank North.....	250	30					
Do.....	Cutbank South.....	300	20					
Do.....	Four Horns Supply.....	165	12					
Flathead (Indian).....	St. Mary Feeder.....	300	11	14	82	800	806	
Do.....	Pablo Feeder.....	300	44					
Do.....	Kickinghorse Feeder <sup>1</sup> .....	400	4					
Do.....	Ninepipe Feeder.....	250	2					
Do.....	Pablo Lateral A.....	400	17					
Do.....	Camas A.....	300	20					

<sup>1</sup> Completed.<sup>2</sup> Exclusive of drains and waste ditches. Mileage given in front of brackets is for entire project; mileage on line with a principal canal is entire system under that canal.<sup>3</sup> Under construction.

*Engineering data for projects when completed—Continued.*CANALS<sup>1</sup>—Continued.

Projects.	Principal canals.			Mileage, with capacity in second-feet.				
	Name.	Maximum capacity.	Length.	Over 800.	301-800.	50-300.	Less than 50.	Total.
Montana—Continued.		Sec.-ft.	Miles.					
Fort Peck (Indian) ..	Little Porcupine <sup>2</sup> ..	250	1			1	13	14
Do. ....	Poplar River B. ....	100	29			11	22	33
Do. ....	Poplar River C. ....	100				18	48	66
Do. ....	Big Porcupine ....	100	7			7	25	32
Do. ....	Missouri Gravity ....	625	100		10	30	60	100
Huntley ..	Main <sup>3</sup> ..	500	32					
Do. ....	Pumping High Line ..	60	12		10	19	198	227
Milk River ..	St. Mary <sup>4</sup> ..	850	29	29				29
Do. ....	Dodson South <sup>5</sup> ..	900	44	44		156	260	480
Do. ....	Dodson North <sup>5</sup> ..	200	29			41	60	101
Do. ....	Vandalia South <sup>5</sup> ..	300	48			45	50	95
Do. ....	Nelson North <sup>5</sup> ..	250	45			40	30	70
Do. ....	Nelson South <sup>5</sup> ..	250	27			34	50	84
Do. ....	Chinook ..	550	56		30	45	10	85
Sun River ..	Fort Shaw <sup>5</sup> ..	175	12			18	103	121
Do. ....	Pishkun Reservoir supply <sup>5</sup> ..	2,500	12	12				12
Do. ....	Sun River Slope <sup>5</sup> ..	1,000	34	34	10	74	286	404
Do. ....	Other units ..				8	54	210	272
Montana-North Dakota: Lower Yellowstone.	Main <sup>3</sup> ..	830	66		49	19	190	258
Nebraska-Wyoming: North Platte.	Interstate <sup>3</sup> ..	1,400	95	90	18	91	607	806
Do. ....	Ft. Laramie ..	1,430	26	62	42	44	300	398
Nevada: Truckee-Carson	Truckee <sup>2</sup> ..	1,500	31					
Do. ....	"V" Line <sup>2</sup> ..	1,500	8					
Do. ....	"L" Line <sup>2</sup> ..	1,210	14.5					
Do. ....	"S" Line <sup>2</sup> ..	1,210	18.7	42	62	80	511	695
Do. ....	"D" Line <sup>2</sup> ..	440	7					
Do. ....	"AA" Line <sup>2</sup> ..	400	13.4					
Do. ....	"T" Line <sup>2</sup> ..	400	9					
New Mexico:								
Carlsbad ..	Main <sup>2</sup> ..	450	3		13	12	120	145
Hondo ..	Main Inlet <sup>2</sup> ..	2,900	1.6		3	2	45	50
New Mexico-Texas:								
Rio Grande ..	Leasburg <sup>2</sup> ..	485	11					
Do. ....	Franklin <sup>2</sup> ..	450	31½					
Do. ....	West Side <sup>2</sup> ..	493	14½					
Do. ....	East Side ..	240	10		34½	78½	27	140
Do. ....	Palomas ..	70	8					
Do. ....	Garfield ..	225	13					
North Dakota:								
North Dakota Pumping.	Buford Trenton <sup>2</sup> ..	60	6			6	39	45
Do. ....	Williston <sup>2</sup> ..	90	3			3	57	60
Oklahoma: Lawton ..	Main ..	60	8			10		10
Oregon:								
Umatilla ..	Feed <sup>2</sup> ..	300	25					
Do. ....	West extension <sup>2</sup> ..	375	30		33	52	90	175
Do. ....	Maxwell ..	140	8					
Oregon-California:								
Klamath ..	Main <sup>2</sup> ..	1,400	9					
Do. ....	Keno <sup>2</sup> ..	635	1					
Do. ....	Lost River Diversion Channel <sup>2</sup> ..	250	8					
Do. ....	East Branch <sup>2</sup> ..	260	4.5	9	9	42	250	310
Do. ....	South Branch <sup>2</sup> ..	205	13.2					
Do. ....	Adams <sup>2</sup> ..	205	12					
Do. ....	Griffith Lateral <sup>2</sup> ..	190	9					
South Dakota:								
Belle Fourche ..	Inlet <sup>2</sup> ..	1,600	6½					
Do. ....	North Side <sup>2</sup> ..	700	45	7	55	105	460	627
Do. ....	South Side <sup>2</sup> ..	300	40					

<sup>1</sup> Exclusive of drains and waste ditches. Mileage given in front of brackets is for entire project; mileage on a line with a principal canal is entire system under that canal.

<sup>2</sup> Completed.

<sup>3</sup> Under construction.

<sup>4</sup> Estimated.

<sup>5</sup> Main and Southern canals 31 miles.

<sup>6</sup> Sidehill canal, built to be utilized as wasteway; length, 8,275 feet.

<sup>7</sup> 5.9 miles completed, Leasburg Canal.



*Engineering data for projects when completed—Continued.*

## CANALS—Continued.

Projects.	Principal canals.			Mileage, with capacity in second-feet.				
	Name.	Maximum capacity.	Length.	Over 800.	391-800.	50-300.	Less than 50.	Total.
Utah:		<i>Sec.-ft.</i>	<i>Miles.</i>					
Strawberry Valley.	Power <sup>1</sup> .....	500	3		3			3
Do.....	Trail Hollow Feeder <sup>1</sup> .....	125	4			4		4
Do.....	Indian Creek <sup>1</sup> .....	750	2		2			2
Do.....	High Line <sup>2</sup> .....	300	17.5			17.5		17.5
Do.....	Lateral 20 <sup>2</sup> .....	55	6.1			1.1	5	6.1
Do.....	Lateral 30 <sup>2</sup> .....	66	8.5			4	4.5	8.5
Do.....	Lateral 31 <sup>2</sup> .....	10	2.4				2.4	2.4
Do.....	Lateral 32 <sup>2</sup> .....	50	2.9			0.9	2	2.9
Do.....	Lateral 33.....	150	2			2.0		2
Do.....	Lateral 34.....	55	11.1			1.3	9.8	11.1
Do.....	Miscellaneous.....	10	33.6				33.6	33.6
Washington:								
Okanogan.....	Main <sup>1</sup> .....	110	2			10	51	61
Yakima.....	Sunnyside Main <sup>1</sup> .....	1,200	60	31	19	15	342	407
Do.....	Snipes Mountain.....	160	13			10	42	62
Do.....	Rocky Ford.....	100	13			1	29	30
Do.....	Mabton.....	110	14			8	44	52
Do.....	Benton Extension.....	80	16			9	13	22
Do.....	Tieton <sup>1</sup> .....	300	12		12	32	291	335
Wyoming: Shoshone.....	Garland <sup>1</sup> .....	1,000	18	11	44	100	710	865
Total.....				448	756.5	2,207.3	10,008.3	13,420.1

<sup>1</sup> Completed.<sup>2</sup> Under construction.

*Engineering data for projects when completed—Continued.*

TUNNELS.			TUNNELS—Continued.		
Projects.	Name.	Length.	Projects.	Name.	Length.
Arizona: Salt River. (All Salt River tunnels built.)	Power Canal: <sup>1</sup>	<i>Feet.</i>	Nebraska-Wyoming: North Platte.	Pathfinder: <sup>1</sup>	<i>Feet.</i>
	Intake.....	1,695		North.....	480
	Lee.....	122		South.....	360
	Wehr cut-off—			Drainage <sup>1</sup> .....	155
	No. 1.....	428		Auxiliary <sup>1</sup> .....	209
	No. 2.....	129		Crosscut <sup>1</sup> .....	55
	No. 3.....	271		Fort Laramie:	
	Wehrl.....	151		No. 1.....	2,700
	Pinto.....	999		No. 2.....	2,150
	Chilton.....	1,027		No. 3.....	3,700
Arizona-California: Yuma. Colorado: Grand Valley.....	Robinson.....	152	Nevada: Truckee-Carson.	Truckee Canal: <sup>1</sup>	
	Gray.....	761		No. 1 <sup>1</sup> .....	901
	Monet.....	214		No. 2 <sup>1</sup> .....	309
	Grapevine.....	872		No. 3 <sup>1</sup> .....	1,515
	No. 6.....	206		Gilpin Spillway <sup>1</sup> .....	115
	No. 7.....	342		Spillway:	
	No. 8.....	553		No. 1 <sup>1</sup> .....	97
	No. 9.....	320		No. 2 <sup>1</sup> .....	103
	No. 10.....	489	New Mexico: Carlsbad.	Spillway from Feed Canal <sup>1</sup> .....	34
	No. 11.....	625		Main Canal <sup>1</sup> .....	3,300
	No. 12.....	70		Oregon-California:	
	No. 13.....	110		Klamath.	
	Roosevelt: <sup>1</sup>			South Dakota: Belle Fourche.	
	Sluicing.....	480		Utah: Strawberry Valley.	
	Outlet.....	167		Strawberry <sup>1</sup> .....	19,897
	Penstock.....	620		Strawberry Dam <sup>1</sup> .....	532
	Colorado River siphon. <sup>1</sup>	930		Power Canal:	
Uncompahgre.....	Main Canal:		Washington:	No. 1 <sup>1</sup> .....	800
	No. 1 <sup>1</sup> .....	3,728		No. 2 <sup>1</sup> .....	705
	No. 2 <sup>1</sup> .....	1,655		Aqueduct <sup>1</sup> .....	750
	No. 3 <sup>1</sup> .....	7,292		Highline Canal <sup>1</sup> .....	227
	Gunnison <sup>1</sup> .....	30,645		Conconully outlet <sup>1</sup> .....	395
	South Canal: <sup>1</sup>			Steeple, No. 1 <sup>1</sup> .....	55
	No. 1.....	482		Steeple, No. 2 <sup>1</sup> .....	43
	No. 2.....	395		Trail Creek <sup>1</sup> .....	3,120
	No. 3.....	1,000		Columnar <sup>1</sup> .....	1,200
	No. 4.....	400	Wyoming: Shoshone <sup>4</sup>	Tieton <sup>1</sup> .....	2,729
	No. 5.....	390		North Fork <sup>1</sup> .....	3,811
	West Canal <sup>1</sup> .....	1,750		Dam: <sup>1</sup>	
	West Canal Extension <sup>1</sup>	800		Lower outlet.....	498
	Selig Extension: <sup>1</sup>			Spillway.....	406
	No. 1.....	160		Upper outlet.....	315
	No. 2.....	380		Corbett <sup>1</sup> .....	17,355
	No. 3.....	100		Ralston Reservoir <sup>1</sup> .....	245
	No. 4.....	310		Shoshone Road: <sup>1</sup>	
Idaho: Boise.....	Arrowrock <sup>2</sup> .....	487		No. 1.....	39
	Penitentiary.....	322		No. 2.....	45
	Arrowrock Log-way.	159		No. 3.....	14
				No. 4.....	28
				No. 5.....	136
				No. 6.....	166
				Highline Canal:	
				No. 1.....	4,497
				No. 2.....	247
				No. 3.....	2,100
Montana: Flathead (Indian).	Newell <sup>3</sup> .....	1,800		No. 4.....	835
	St. Marys Lake Outlet.	1,620		No. 5.....	265
	Pablo 31A <sup>1</sup> .....	441		No. 6.....	2,025
	Main Canal:			No. 7.....	230
	No. 1 <sup>1</sup> .....	724		No. 8.....	283
	No. 2 <sup>1</sup> .....	1,545		No. 9.....	120
	No. 3 <sup>1</sup> .....	385		No. 10.....	185
	Willow Creek <sup>1</sup> .....	584		Willwood:	
	Sun River Storage.	200		No. 1.....	580
	Pishkun Canal:			No. 2.....	375
Sun River.....	No. 1 <sup>1</sup> .....	695	Total.....		
	No. 2 <sup>1</sup> .....	1,022			
	No. 3 <sup>1</sup> .....	2,277			
	Sun River Diversion Tunnel. <sup>1</sup>	87			
	Muddy Creek Reservoir.	700			
					167,029

<sup>1</sup> Completed.<sup>2</sup> Arrowrock Tunnel, 190 feet of the 487 feet under dam section, has been filled with concrete.<sup>3</sup> 1,703 feet driven. Completed for first development (unlined).<sup>4</sup> Ralston Reservoir tunnel is a sluicing tunnel for the settling basin of Corbett tunnel.

*Engineering data for projects when completed—Continued.*

## IRRIGABLE AREA.

Projects.	Name of units.	Area.	
		Unit.	Total.
		<i>Acres.</i>	<i>Acres.</i>
Arizona: Salt River.....	(Gravity system.....	182,754	191,754
	Pumping system.....	9,000	
	Gila Valley (Ariz.).....	19,000	
Arizona-California: Yuma.....	Yuma Valley (Ariz.).....	53,130	127,257
	Mesa pumping (Ariz.).....	40,000	
	Reservation (Cal.), Indian, 8,130 acres.....	15,127	
California: Orland.....	North side.....	6,761	20,320
	South side.....	13,556	
Colorado:			
Grand Valley.....	(Gravity system.....	42,750	53,000
	Pumping system.....	10,250	
	South Canal system.....	13,600	
	Montrose and Delta system.....	33,600	140,000
	West Canal system.....	7,200	
Uncompahgre.....	Loutsenhizer Canal system.....	11,200	
	Selig Canal system.....	22,400	26,000
	East Canal system.....	22,000	
	Ironstone Canal system.....	26,000	
	Garnet Canal system.....	4,000	77,367
	Boise division (Penitentiary subdivision, 810; New York, 12,234; Cole, 4,899; Rawson, 11,231; Kuna, 7,779; Beatty, 14,028; Meridian 15,763; Sonma, 8,152; Ridenbaugh, 2,371).		
	Nampa division (Ridenbaugh High Line, 4,171; Ridenbaugh Low, 5,391; Mora, 17,223; Deer Flat N., 3,308; Robinson Hill, 1,762; Deer Flat S., 11,444; Madden, 1,295; Melba, 15,000; Nampa, 4,119).	63,713	
Idaho:			
Boise.....	Caldwell division (Homestead, 2,535; Valley Mound, 5,350; Golden Gate, 13,594; Deer Flat, north, 2,334; Pipe Gulch, 5,653; Deer Cald- well, 2,898; Arena (2,000 acres in Oregon), 9,186; Deer High Line, 3,742; Fargo, 4,800; Crest, 4,824; Frohman, 7,064; Forest, 2,668).	65,178	255,000
	Small pumping areas.....	742	
	Pioneer irrigation district and extensions.....	48,000	
Minidoka.....	Gravity system.....	71,300	120,100
	Pumping system.....	48,800	
Kansas: Garden City.....	All units.....	10,677	10,677
Montana:			
	Cutbank north and south units.....	38,000	122,500
Blackfeet (Indian).....	Two Medicine unit.....	48,000	
	Badger-Fisher unit.....	33,000	
	Birch unit.....	3,500	152,000
	Jocko division.....	16,000	
	Mission division.....	23,000	
	Post division.....	30,000	152,000
Flathead (Indian).....	Crow division.....	14,000	
	Pablo division.....	40,000	
	Polson division.....	6,000	152,000
	Big Arm division.....	3,000	
	Camas division.....	20,000	
	Little Porcupine.....	2,000	152,000
	Poplar River.....	28,000	
	Big Porcupine.....	4,000	
Fort Peck (Indian).....	Big Muddy.....	16,000	152,000
	Missouri River.....	84,000	
	Galpin Bottom Pumping.....	10,000	
	Milk River.....	8,000	32,877
Huntley.....	First unit (pumping 3,420 Ac.).....	28,998	
	Second unit.....	1,815	
	Third unit (Pumping 2,035 Ac.).....	2,064	219,557
	Dodson, north unit.....	12,000	
	Dodson, south unit.....	42,000	
Milk River.....	Nelson Reservoir, north unit.....	24,000	219,557
	Nelson Reservoir, south unit.....	22,000	
	Vandalia, south unit.....	22,500	
	Chinook.....	97,057	

*Engineering data for projects when completed—Continued.*

## IRRIGABLE AREA.

Projects.	Present status.							
	Public land.			State land.	Indian land.	Private land.		Total.
	Entered.	Open.	Withdrawn.			Railroad.	Other.	
	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>
Salt River.....	14,339			11,030	(Notes)		166,385	191,764
Yuma.. { Ariz.....	7,112	3,239	33,600	7,138			61,041	112,130
{ Cal.....	4,940	60	160		8,130		1,537	15,127
Orland.....			4				20,316	20,320
Grand Valley.....	13,250		16,820				22,930	53,000
Uncompahgre.....	16,332		21,920				101,748	140,000
Boise.....	73,700	205	300	18,500			162,295	255,000
Minidoka.....	97,373	727		19,900			2,100	120,100
Garden City.....							10,677	10,677
Blackfeet (Indian) .....	11,000		53,000		58,500			122,500
Flathead (Indian) .....	45,350		10,000		95,760		890	152,000
Fort Peck (Indian) .....			107	180	142,000		9,713	152,000
Huntley.....	24,870	1,945	2,065				3,907	32,877
Milk River.....	45,740		25,889	9,296	30,000	120	108,542	219,587

*Engineering data for projects when completed—Continued.*

## IRRIGABLE AREA—Continued.

Projects.	Name of units.	Area.	
		Unit.	Total.
Montana—Continued.		<i>Acres.</i>	<i>Acres.</i>
Sun River.....	Fort Shaw unit.....	16,325	174,025
	Great Falls unit.....	15,700	
	Sun River Slope, Spring Valley.....	15,000	
	Sun River Slope, Greenfields Bench.....	75,000	
	Greenfields Lake.....	15,000	
	Benton Lake.....	21,000	
Montana-North Dakota: Lower Yellowstone.	Muddy Creek Canal.....	16,000	60,116
	First unit.....	42,450	
	Extensions.....	17,666	
Nebraska-Wyoming: North Platte (interstate unit).	North Platte Canal & Colonization Co. ....	17,837	129,684
	First lateral district.....	39,559	
	Second lateral district.....	33,727	
	Third lateral district.....	38,561	
Fort Laramie unit.....		100,000	100,000
Nevada: Truckee-Carson.....	(Lahontan Valley (Lower Carson).....	151,000	206,000
	Truckee Canal district.....	13,800	
	Lahontan Bench.....	7,200	
	Churchill Valley.....	14,000	
New Mexico: Carlsbad.....	Pyramid Lake extension.....	20,000	24,796
	First unit.....	20,261	
Hondo.....	Second unit.....	4,535	10,000
	All units.....	10,000	
New Mexico-Texas: Rio Grande..	Palomas Valley.....	6,985	155,000
	Rincon Valley.....	21,781	
	Mesilla Valley, Leasburg unit.....	36,772	
	Mesilla Valley, other units.....	60,432	
	El Paso Valley.....	29,030	
North Dakota: North Dakota pumping.	Buford-Trenton unit, first division.....	4,050	15,025
	Extensions.....	1,375	
	Canal "B," Upper Bottom division.....	2,600	
	Canal "B," Lower Bottom division.....	4,000	
	Trenton Flat.....	3,000	
	Williston unit, first division.....	8,189	11,289
Oklahoma: Lawton.....	West Bottom division.....	1,900	
	East Bottom division.....	1,200	
	Lawton unit.....	2,500	2,500
Oregon: Umatilla.....	West extension.....	11,100	36,300
	Hermiston unit (first).....	6,968	
	Second unit.....	4,380	
	Third unit.....	3,957	
	Fourth unit.....	1,976	
	Fifth unit.....	155	
Oregon-California: Klamath.....	Umatilla unit.....	1,150	144,430
	Other units.....	6,644	
	First unit.....	29,600	
	Second unit.....	6,600	
	Third (Tule) unit.....	35,000	
	Sand Hollow unit.....	13,500	
South Dakota: Belle Fourche....	Horsefly unit.....	22,000	97,916
	Pine Grove.....	3,730	
	Additional units.....	34,000	
	First unit.....	11,245	
	Second unit.....	35,852	
	Third unit.....	18,378	
Utah: Strawberry Valley.....	Fourth unit.....	13,116	50,000
	Other units.....	19,325	
	Mapleton unit.....	3,500	
	Lake Shore unit.....	2,500	
Washington: Okanogan.....	High Line unit.....	24,000	10,000
	Old canals.....	20,000	
	First unit.....	2,018	
	Second unit.....	6,085	
Okanogan.....	Third unit.....	464	10,000
	Old water rights.....	1,331	
	Town of Okanogan.....	151	

*Engineering data for projects when completed—Continued.*

## IRRIGABLE AREA—Continued.

Projects.	Present status.							
	Public land.			State land.	Indian land.	Private land.		Total.
	Entered.	Open.	Withdrawn.			Railroad.	Other.	
	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
Sun River.....	46,349	2,777	36,068	12,559	.....	.....	76,252	174,025
Lower Yellowstone. {Mont.....	8,593	405	333	1,514	.....	3,839	26,267	39,951
{N. Dak.....	7,631	.....	325	145	.....	.....	12,064	20,165
North Platte (interstate/Nebr..	71,061	2,821	6,204	4,962	.....	.....	23,967	109,015
unit).                  {Wyo..	2,165	464	.....	.....	.....	.....	18,060	20,669
Fort Laramie unit. {Nebr..	8,542	.....	7,191	3,315	.....	.....	26,179	45,227
{Wyo..	17,153	.....	27,282	3,861	.....	.....	6,477	54,773
Truckee-Carson.....	18,401	4,340	100,779	180	4,640	26,900	50,760	206,000
Carlsbad.....	.....	.....	.....	923	.....	.....	23,873	24,796
Hondo.....	240	.....	.....	.....	.....	.....	9,760	10,000
Rio Grande..... {N. Mex.	300	.....	4,335	2,813	.....	.....	102,582	110,000
{Tex.	.....	.....	.....	.....	.....	360	44,040	45,000
Buford-Trenton.....	326	212	1,931	111	.....	.....	12,445	15,025
Williston unit.....	54	289	.....	67	.....	.....	10,879	11,289
Lawton.....	.....	.....	.....	.....	600	.....	1,900	2,500
Umatilla.....	3,328	61	4,381	.....	.....	3,342	25,188	36,300
Klamath..... {Oreg.	44	23	1,346	.....	.....	.....	77,270	78,683
{Cal.	.....	.....	66,187	.....	.....	.....	560	66,747
Belle Fourche.....	28,097	8,381	14,603	5,000	.....	.....	41,835	97,916
Strawberry Valley.....	.....	.....	3,500	.....	.....	.....	46,500	50,000
Okanogan.....	.....	.....	.....	.....	.....	.....	10,009	10,009

*Engineering data for projects when completed—Continued.*

## IRRIGABLE AREA—Continued.

Projects.	Name of units.	Area.	
		Unit.	Total.
Washington—Continued.		<i>Acres.</i>	<i>Acres.</i>
Yakima, Sunnyside unit.....	Konnewock lands.....	3,080	110,828
	Main project.....	74,617	
	Mabton division.....	9,000	
	Prosser division.....	1,169	
	Pumping lands.....	18,362	
Yakima, Tieton unit.....	Benton extension.....	4,800	33,601
	Naches Ridge, division 1.....	10,799	
	Cowiche-Yakima, division 2.....	7,941	
	Wide Hollow, division 3.....	14,831	
	First unit.....	15,245	
Wyoming: Shoshone.....	Second unit.....	15,756	149,360
	Third unit.....	3,722	
	Fourth unit.....	6,375	
	Fifth unit (lateral A extension).....	3,582	
	Subsequent units.....	104,700	
Total, all projects.....		3,118,011	3,118,011
Per cent.....		100	100

## NOTES.

*Arizona, Salt River.*—Total area within project boundaries, 219,691 acres; uncultivated area (27,936 acres) excluded, leaving 191,754 acres, net present estimated area of project. Of the private land, 8,374 acres are in town sites. Entered land is under water rental. In addition to above, there are 2,814 acres of Indian lands.

*Arizona-California, Yuma.*—(1) Arizona lands: Entered land not under public notice. Withdrawn lands include 29,300 acres mesa lands. Private lands include Gadsden town site, 225 acres, and Somerton town site, 80 acres. (2) California lands: Entered land under public notice. Withdrawn, Bard town site, 160 acres. Private land includes agricultural experiment farm, 160 acres.

*California, Orland.*—Private land includes farms with total area of 320 acres under vested water rights, and 500 farms, 19,996 acres, under rental contract.

*Colorado, Uncompaghe Valley.*—No public notices issued. Entered lands are under water-right application, rental contracts, and vested water rights. Withdrawn land, water not available. Private land, under water-right application, and 12,505 acres under vested water rights.

*Idaho, Boise.*—No public notice issued. Area for which canals built and full water supply furnished, 150,000 acres. Pioneer irrigation lands to receive storage water from Arrowrock, 34,000 acres. Nampa and Meridian lands voted to receive Arrowrock water, 24,600 acres; New York lands applied to receive Arrowrock water, 21,000 acres. Future extensions, 25,000 acres.

*Montana, Blackfoot.*—Entered land is land outside of Blackfeet Reservation opened for entry and homesteaded, but construction not yet begun. Withdrawn land is vacant land on reservation not yet open to entry. Indian land includes 18 farms, 1,000 acres, irrigated; 642 farms, 25,650 acres, water available; and 800 farms, 31,850 acres, for which water not available.

*Montana, Flathead.*—No public notice. Entered lands under water rental.

*Montana, Fort Peck.*—Of the 142,000 acres Indian lands, 54,857 acres not allotted. No lands open to entry.

*Montana, Huntley.*—All entered and private land under public notice. Withdrawn land, water not available.

*Montana, Milk River.*—No public notices. Entered land includes 100 farms, 15,767 acres, under rental contract; 320 farms, 29,973 acres, for which water not available. Withdrawn land is that for which water not available. Private lands include 46,700 acres under vested water rights.

*Engineering data for projects when completed—Continued.*

## IRRIGABLE AREA—Continued.

Projects.	Present status.							Total.
	Public land.			State land.	Indian land.	Private land.		
	Entered.	Open.	With-drawn.			Rail-road.	Other.	
	Acres..	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
Sunnyside unit.....	1,526	.....	1,078	1,158	.....	.....	107,066	110,828
Tieton unit.....	1,953	201	.....	2,274	.....	329	28,844	33,601
Shoshone.....	30,072	8,005	101,715	6,346	.....	.....	3,132	149,360
.....	599,841	34,235	540,143	111,242	339,630	34,890	1,458,030	3,118,011
.....	19.2	1.1	17.3	3.6	10.9	1.1	46.8	100

## NOTES.

*Montana, Sun River.*—Entered lands include 10,421 acres under public notice, 200 acres in towns, and 51,928 acres for which water is not available. Open lands include 2,716 acres under public notice and 169 acres in towns. Withdrawn land includes land for which water is not available. Private land includes 1,899 acres under public notice, 58,726 acres for which water is not available, and 218 acres under vested water rights. State lands include 281 acres entered under public notice and 11,538 acres not entered.

*Montana-North Dakota, Lower Yellowstone.*—Montana lands: 5,386 acres public lands entered under public notice. North Dakota lands: 910 acres public lands entered under public notice.

*Nebraska-Wyoming, North Platte.*—Nebraska lands: All open public lands and 62,343 acres entered lands under public notice. Withdrawn lands include 403 acres reserved for camp sites in first and second lateral districts. Wyoming lands: All public lands under public notice. Private lands include 17,837 acres under North Platte Canal & Colonization Co.

*Nevada, Truckee-Carson.*—Entered lands are under public notice. Private lands, 19,423 acres under vested water rights.

*New Mexico, Carlisle.*—All private and State lands under public notice; 20,168 acres covered by approved water-right applications.

*New Mexico, Hondo.*—No public notice. Private lands, 1,200 acres under water-rental contracts.

*New Mexico-Texas, Rio Grande.*—No lands under public notice. Under vested water rights: In New Mexico, 18,946 acres; in Texas, 13,180 acres.

*North Dakota, North Dakota pumping.*—All entered and open land under public notice.

*Oklahoma, Lawton.*—No public notices issued. No farm units established. No charges announced. Duty of water not fixed.

*Oregon, Umatilla.*—Entered lands, 2,673 acres under public notice; 2,048 acres private lands under vested water rights.



## SUMMARY OF CONSTRUCTION RESULTS.

Summary of construction results to June 30, 1915.

Projects.	Irrigable lands.												Available (original) reservoir capacity.
	Estimated on completion.			Service could have supplied June 30, 1915. <sup>1</sup>			June 30, 1915.			Total under contract.			
							Under water rights.			Under rental contracts.			
	Acres.	Farms.		Acres.	Farms.		Acres.	Farms.		Acres.	Farms.		
Arizona: Salt River.....	191,754	3,600		191,754	3,600		191,754	3,600		191,754	3,600	1,807,300	
Arizona-California: Yuma.....	127,257	2,459		71,200	1,750		32,653	563		39,153	737	51,800	
California: Orland.....	20,320	502		20,320	502		6,500	174		20,320	502		
Colorado:													
Grand Valley.....	53,000	900										4,000,000	
Uncompahgre Valley.....	140,000	3,500		65,000	1,100					65,000	1,100		
Idaho, Boise:													
Distribution unit.....	255,000	3,312		230,000	2,967					93,130	1,908	177,600	
Storage unit.....	120,100	2,229		119,800	2,229		65,700	1,203		108,764	1,862	190,000	
Idaho-Wyoming:												53,500	
Snake River storage unit.....												380,000	
Jackson Lake enlargement.....												46,000	
Kansas: Garden City.....													
Montana:	10,677	284											
Blackfeet (Indian).....	122,500	3,000		26,649	661					1,500	30	16,000	
Flathead (Indian).....	132,000	2,980		49,400	820					10,075	180	10,000	
Fort Peck (Indian).....	152,000	2,700		10,220	255							3,900	
Huntley.....	32,877	691		30,813	646		25,775	579		26,775	579		
Milk River.....	219,557	3,000		39,674	221					5,000	70	830	
Sun River.....	174,028	2,900		16,346	261		10,748	194		11,896	198	16,700	
Montana-North Dakota: Lower Yellowstone.....	80,116	722		36,250	465		3,301	51		27,120	345		
Nebraska-Wyoming: North Platte, Interstate and Fort Laramie.....	229,684	2,556		129,684	1,456		81,116	1,034		20,260	156	1,148,400	
Nevada: Truckee-Carson.....	206,000	8,334		65,000	722		32,509	483		13,048	107	350,000	
New Mexico:													
Carlsbad.....	21,798	617		21,798	616		20,553	519		20,603	520	77,000	
Hondo.....	10,000	159		1,606	29					1,606	29	40,000	
New Mexico-Texas, Rio Grande:													
Distribution unit.....	155,000	5,000		47,100	1,182					47,100	1,182	625,000	
Storage unit.....													



## Summary of construction results to June 30, 1915—Continued.

Projects.	Canals and drains (miles).										Tunnels.		Storage dams.				Diversion dams.				Levees and dikes.		
	Canals.					Drains.		Waste-water ditches.	Grand total.	Number.	Length (feet).	Masonry.	Earth.	Rock fill.	Total.	Masonry.	Earth.	Rock fill.	Crib.	Total.	Length.	Volume.	
	Capacity (second-feet).				Total.	Open.	Closed.																Total drains and ditches.
	Over 800.	301 to 800.	50 to 300.	Less than 50.																			
Arizona:																							
Salt River.....	32	71	78	552	733	14			747	23	10,998												
Water users' work.....		6							6														
Southside work.....		17	49	66					66														
Gila River (Indian).....		11	9	20					21														
Arizona-California: Yuma.....	17	12	62	224	315	12	4	16	331	1	990												
California: Orland.....		38	107	145					145														
Colorado:																							
Grand Valley.....	4	30		40	74	1	1	2	76	3	12,670												
Uncompaghe Valley.....	12	23	91	232	358	10		10	368	12	36,792												
Idaho, Boise:																							
Distribution unit.....	40	57	165	712	974	66	56	1	123	1,097	1	322											
Storage unit.....																							
Idaho:																							
Milkdote.....	25	19	106	463	613	11	108		119	732													
Idaho-Wyoming:																							
Snake River storage unit.....																							
Jackson Lake.....																							
Kansas: Garden City.....			2	2	4				4														
Montana:																							
Blackfoot (Indian).....			85	250	335				335														
Fishhead (Indian).....		11	83	279	373				373	2	2,144												
Fort Peck (Indian).....			36	83	119				119														
Huntley.....			10	19	193	227	72	6	29	107	334	3	2,654										
Milk River.....		8	36	72	110	226	88		315														
St. Mary storage.....		25							25														
San River.....		6	28	21	103	158	12		170	5	4,632												
Montana-North Dakota:																							
Lower Yellowstone.....		49	19	144	212	34	2		248														

Nebraska-Wyoming: North Platte.....	90	18	91	607	873	23	13	9	42	848	5	1,259	61,444	998,229	1,059,664	4,966	75,775	80,741	131,110
Nevada: Truckee-Carson.....	42	62	80	340	524	13	165	4	182	705	4	2,840	69,327	346,377	681,254	6,028	29,803	35,831	92,176
New Mexico: Carlsbad.....	13	12	120	145	5	3	8	153	2	200	50	100,643	100,643	100,643	150,744	6,251	107,146	168,773	171,000
Hondo.....	3	2	45	50	50	50	50	50	50	50	50	616,282	616,282	616,282	639,992	3,700	3,700	3,700	3,700
New Mexico-Texas, Rio Grande:																			
Distribution unit.....	35	24	59	59	59	59	59	59	59	59	59	548,200	548,200	164,650	712,850	2,673	1,878	4,551	18,859
Storage unit.....																			4,200
North Dakota, North Dakota pumping:																			
Buford-Trenton unit.....			1	14	15	15	15	15	15	15	15								
Williston unit.....			3	43	48	15	15	15	15	15	15								
Okahoma: Lawton.....			33	60	127	10	10	10	10	10	10	9,500	9,500						
Oregon: Umatilla.....			9	1	51	126	187	10	29	39	226	1	3,300	757,000	793,400	4,640	7,830	13,860	8,000
Oregon-California: Klamath.....			7	43	101	424	575	12	587	12	587	1	1,396	23,100	56,600	5,600	13,100	18,700	40,300
South Dakota: Belle Fourche.....			5	4	9	9	9	9	9	9	9	26,160	26,160	1,546,000	1,572,160	12,149	4,800	16,949	
Utah: Strawberry Valley.....			10	53	63	1	1	1	1	1	1	22,161	22,161	108,415	108,415	1,261	23,705	24,966	102,517
Washington: Okanogan.....			10	53	63	1	1	1	1	1	1	395	395	336,000	336,000	132	630	892	
Yakima.....																			
Storage unit.....																			
Sunnyside unit.....			31	19	43	479	572	10	10	582				670,191	670,191	2,291	2,070	2,291	18,000
Tieton unit.....			12	32	291	335	1	1	1	335	6	10,963	2,516		2,516	609	2,070	2,980	1,584
Wyoming: Shoshone.....			11	14	27	212	264	26	9	338	11	19,249	75,576		75,576	4,951	5,200	10,151	5,200
Total to June 30, 1915.....	359	610	1,420	6,371	8,760	414	418	91	923	9,683	89	133,309	1,768,037	8,953	273,505	718	277,837	975,028	90,640,766
Total to June 30, 1914.....	325	534	1,318	5,826	8,007	548	548			8,555	83	129,341							85,437,990
Increase.....	34	72	102	545	753	284	284				3	3,969							285,816

## Summary of construction results to June 30, 1915.

Projects.	Canal structures—number.										Bridges—number and length.											
	Over \$2,000.		\$500 to \$2,000.		\$100 to \$500.		Less than \$100.		Total.	Steel.		Combination.		Wood.		Concrete.		Total.				
	Concrete.	Wood.	Concrete.	Wood.	Concrete.	Wood.	Concrete.	Wood.		Over 50.	Under 50.	Over 50.	Under 50.	Over 50.	Under 50.	Over 50.	Under 50.		No.	Length.		
Arizona:	45		267	9	269	461	35	849	1,955		Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.		
Salt River.			3		6				15		2	1	186	13	33	1,852	9	270	3,759	343	6,521	
Water users' work.	6		2																	5	6	
South side work.			5		38				247											43	66	
Indian project, Gila River.			1		40				50											10	25	
Arizona-California: Yuma.	27	3	36	16	186	413	280	1,329	2,289		9	270	5	16	785	10	70	2,572	6	17	714	
California: Orland.	8		15	1	60	12	1,663	21	1,819											124	199	
Colorado:																				276	1,026	
Grand Valley.	16		42	31	25	35	2	610	761											32	1,640	
Uncompahgre Valley.	28	29	22	54	31	99	5	1,749	2,017											194	3,686	
Idaho:																						
Bolsa—																						
Distribution unit.	72		107	35	2,071	1,913	1,079	7,136	12,413											1,008	16,057	
Storage unit.											1		96							21	1,344	
Minidoka.	27	2	74	10	865	286	52	6,257	7,573											333	11,550	
Idaho-Wyoming: Jackson Lake enlargement.																						
Kansas: Garden City.	1																			1	360	
Montana:																				3	60	
Blackfeet (Indian).	9	1	6	7	35	8	102	1,076	1,244											44	997	
Flathead (Indian).	22	2	23	6	102	80	118	1,375	1,728											146	2,785	
Fort Peck (Indian).	9		6		37	3	129	175	359											34	703	
Hunkley.	26	3	28	4	88	106	150	2,115	2,520		1	1	104	1	36					145	2,192	
Milk River.	40		66	21	132	99	30	782	1,170		1	1	115							121	3,471	
St. Mary storage.	5										1	1	200	11	27	1				39	1,432	
Sun River.	12		22	9	39	16	135	545	769											42	1,456	
Montana-North Dakota: Lower Yellowstone.	59	1	111	2	45	70	104	1,363	1,755											193	4,013	
Nebraska-Wyoming: North Platte.	32	24	149	25	1,055	84	1,036	4,000	6,445											171	5,395	
Nevada-Truckee-Carson.	63	3	172	5	260	154		1,200	1,363											143	4,925	
New Mexico:																						
Carlsbad.	7		6		34		380		427											1	225	
Hondo.			10		77		11		98											11	130	

### SUMMARY OF CONSTRUCTION RESULTS.

	21	3	34	37	24	37	111	267	1	300	6	13	855	3	70	2,444	1	10	259	103	3,558 1,186
New Mexico-Texas Rio Grande:																					
Distribution unit.....																					
Storage unit.....																					
North Dakota: North Dakota pump-																					
ing.....																					
Burland-Trenton unit.....	2		1		8	-	80	91			4	68				31				4	68
Williston unit.....			11		23		3	445			12	225				30				15	256
Oregon: Umatilla.....	15		10		35		517	832	1	185					49	1,030		3	66	53	1,281
Oregon-California: Klamath.....	10	5	11	23	52	37	823	964						20	123	5,218			172	5,218	3,996
South Dakota: Belle Fourche.....	28	1	101	19	238	189	26	3,057	5	360			3	816	3,038	2	28		236	3,996	1,290
Utah: Strawberry Valley.....	13		1		70			84			11	280			28	680	2	13	330	64	1,290
Washington.....																					
Okanogan.....	1		2		53	3	223	1,932							3	100				3	100
Yakima.....																					
Storage unit.....																					
Sunnyside unit.....	53	13	24	2	220	6	150	6,022	2	500		140		4	300	300		1	20	7	716
Teton unit.....	19	16	70	6	337	43	533	6,496					7	47	1,513	1			56	2,033	
Wyoming: Shoshone.....	31	2	37	2	118	25	972	1,945	4	3	416			8	2,518				173	3,548	
Total, June 30, 1915.....	730	107	1,432	321	6,066	4,129	7,226	44,154	46	39	5,433	195	7,311	270	3,743	85,922	17	267	3,740	4,622	102,406
Total, June 30, 1914.....	615	75	1,264	206	5,978	3,748	5,622	37,087	45	39	5,337	155	6,004	209	3,177	70,903	16	194	3,191	3,876	85,225
Increase.....	85	32	218	117	718	381	1,604	7,067	10,222	1	0	96		61	566	15,319	1	73	549	747	17,181

## Summary of construction results to June 30, 1915—Continued.

Projects.	Culverts.										Pipe.									
	Concrete.			Metal.		Terra cotta.		Wood.		Total.		Drain.	Total.				Grand total.	Lin. ft.		
	No.	Length.	No.	Length.	No.	Length.	No.	Length.	No.	Length.	Pressure.		Culvert.	Metal.	Terra cotta.	Wood.				
Arizona:																				
Salt River.....	58	3,069	38	1,170			123	3,107	219	7,366	2,825	4,424	11,246	14,155	1,515	2,825	2,825	18,495		
Water users' work.....													4,244	416				4,244		
South side work.....	40	1,214								40	1,214									
Indian project, Gila River.....	15	300								15	300	6,034			6,034					
Arizona-California: Yuma.....	139	2,690	3	61	5	260	384	6,332	531	9,333	8,938	301	21,075	240	61	21,075	500	21,576		
California: Orland.....	119	4,210	2	40					121	4,250	8,938	4,032		12,920	40	60		13,020		
Colorado:																				
Grand Valley.....	6	885	22	2,794	53	4,065			81	7,734	15,930	4,850					1,500	22,280		
Uncompaggre Valley.....	25	2,901	22	1,218	2	140	47	835	96	5,064	18,573	1,974	4,558	1,509	8,514	4,758	10,324	25,105		
Idaho:																				
Boise—																				
Distribution unit.....	17	1,009					360	5,048	377	6,057	99,129	1,009	4,000	80,205	728	4,780	22,833	74,138		
Storage unit.....							100	2,980	100	2,980	6,870		4,780		2,770	4,780	4,100	11,660		
Minidoka.....	22	2,196	677	17,948			312	9,183	1,011	29,307	10,171	15,197		2,255	4,717		13,366	25,368		
Idaho-Wyoming: Jackson Lake enlargement.....											3,872									
Montana:																				
Blackfoot (Indian).....	26	2,088	2	36			87	5,029	115	7,738			6,128	4,782	1,816			6,128		
Flathead (Indian).....	25	1,446	2	78			90	1,614	117	3,128	2,160	4,424		1,933	2,235			6,128		
Fort Peck (Indian).....	7	180					13	218	20	368	2,235			1,534				2,235		
Huntley.....	39	2,055	95	3,214	28	1,440	381	8,471	513	15,180	3,120	6,293	150,480	2,826	3,124	183,840	169,880			
Milk River.....	24	2,252	32	1,569	103	5,264	9	187	172	9,265	5,713	2,000	6,208	6,208	2,434	9,137	17,068			
St. Mary storage.....	2	371					85	1,700	87	2,004	4,294	3,013						17,068		
Sum River.....	79	5,476			1	22	127	2,363	207	7,861	610		1,647		810	126	2,434			
Montana-North Dakota: Lower																				
Yellowstone.....	40	3,822			45	3,848	212	4,108	297	11,778			17,947			17,947	17,947			
Nevada-Wyoming: North Platte.	48	1,439	114	2,799	90	1,816	54	861	306	6,048	5,019	12,436	3,496	4,245	62,721	4,154	74,716			
Nevada: Truckee-Carson.....					5	268	28	1,258	33	1,516	5,727	258	24,803	2,227	3,500	25,031	30,788			
New Mexico:																				
Carlsbad.....	1	400								400			16,598	1,902		15,096	16,998			
Hondo.....			1	448					1	448			448				448			
New Mexico-Texas: Rio Grande:																				
Distributive unit.....			13	1,214						13	1,214	220	1,214		1,434			1,434		
Storage unit.....							12	260												





## Summary of construction results to June 30, 1915—Continued.

Projects.	Flumes.						Canal lining.		Buildings.						Wells.					
	Concrete.		Metal.		Wood.		Total.	Length.	Concrete.	Miles.	Feet.	Offices.	Residences.	Power plants.	Pumping sta.	Barns, store-houses, etc.	Total.	Number.	Depth.	
	Number.	Length.	Number.	Length.	Number.	Length.														
Arizona:																				
Salt River users' work.	9	287	10	679	34	1,559	53	2,535	0.5	Miles.	Feet.	1	17	1	9	10	38	34	8,511	
South Side work.	1	595			1	16	1	695				3	3	2			5	1	165	
Indian project, Gila River.																				
Arizona-California: Yuma.																				
California: Orland.	1	30			12	1,159	13	1,189	0.2			1	5	1	8	5	12	10	2,054	
Colorado:																				
Grand Valley.			2	365	5	500	7	865	16.0			1	1			4	6	3	200	
Uncompaggre Valley.																				
Idaho:																				
Boise—																				
Distribution unit.	1	13	82	43,520	233	8,126	316	51,659	7.4			10	11			25	46	4	760	
Storage unit.																				
Minnesota:																				
Storage unit.	2	190	13	908	192	12,464	207	13,662	1			3	11	1	8	19	42	15	980	
Idaho-Wyoming:																				
Snake River storage unit.																				
Jackson Lake enlargement.																				
Kansas: Garden City.												1	10		2	10	3	1	25	
Montana:																				
Blackfeet (Indian).			3	216	3	503	6	1,719				1	1			2	4	6	184	
Flathead (Indian).			2	3,028	48	8,174	50	11,202	5			6	19			21	46	3	80	
Fort Peck (Indian).			4	608	2	90	6	698				3	17			18	18	3	75	
Huntley.	2	168	15	2,640	20	2,285	37	5,068	1			6	11		1	11	24	4	625	
Milk River.			19	4,111	10	623	29	4,734	6			4	3			7	14	8	95	
St. Mary storage.			1	720			1	720				4	49			43	96	2	60	
Sun River.			2	330	4	190	6	520	4			6	40			37	83	7	323	
Montana-North Dakota: Lower Yellowstone.	10	841	2	580	31	1,221	43	2,642				4	16			8	28	8	214	
Nebraska-Wyoming: North Platte.	2	466	38	11,198	3	1,320	43	11,784				2	17			6	15	15	1,516	
Nevada: Truckee-Carson.			2	300	2	220	4	520	2.5			5	15	1	1	7	29			
New Mexico:																				
Carlsbad.	1	497	1	40			2	537	9.8			1	5			10	16	1	127	
Hondo.																		1	365	
New Mexico-Texas:																				
Rio Grande—																				
Distribution unit.			6	204	3	142	9	346	2.0				2			2	4	2	28	
Storage unit.												1	128	1	1		188	1	20	

[illegible]

## Summary of construction results to June 30, 1915—Continued.

Projects.	Roads.	Railroads.	Telephone lines.		Transmission lines.	Power developed.	Material excavated.				Riprap placed.	Paving placed.	Stone masonry.	Concrete.	Cement used.	Cement and sand turned.
			Mileage.	Telephones.			Class 1, earth.	Class 2, in- dured material.	Class 3, rock.	Total.						
Arizona:	147		215	72	Mf.	8,640	Cu. yds. 3,736,489	Cu. yds. 1,024,762	Cu. yds. 530,664	Cu. yds. 5,341,915	Cu. yds. 7,000	Sq. yds. 11,172	Cu. yds. 916	Cu. yds. 341,627	Barrels. 420,572	Barrels. 338,452
Salt River.....	5				12	4,260	314,781	14,300	117,180	446,261		15,284		13,942	17,722	
Water users' work.....					3		222,498	18,284	4,488	246,248		1,048		1,702	3,038	
South Side work.....					23		302,285	16,261	9,452	327,998		2,154		1,687	2,109	
Indian project, Gila River.....	10		23	7			11,034,701	373,057	1,314,257	12,722,015	600,431	100,908		97,534	98,210	
Arizona-California: Yuma.....	25	36	140	114			552,418	192,123	14,425	758,966	1,387	3,223		30,920	34,428	
California: Orland.....			160	19												
Colorado:							2,324,000	270,500	105,300	2,699,800	4,200	11,760		52,900	62,100	
Grand Valley.....	1		43	3			2,113,304	715,492	456,728	3,285,525	6,680	1,420		88,627	83,092	
Uncompagre Valley.....	22	7	34	27	7											
Idaho:																
Boise—																
Distribution unit.....	15		167	95			11,069,642	1,250,928	237,241	12,557,811	9,425	19,068	24,357	63,988	90,216	
Storage unit.....	29	19	52	54	28	2,550	970,650	107,850	545,600	1,624,100	6,900			614,150	415,967	585,240
Mindoka.....	8		140	112	73	10,000	10,906,615	201,688	416,239	11,524,542		93,496		39,984	44,726	
Idaho-Wyoming:																
Snake River storage unit.....	38		70	7			183,000		6,749	189,749	4,037	11,364		3,649	8,182	
Jackson Lake enlargement.....						1,700	87,083		6,381	93,466				10,996	8,383	
Kansas: Garden City.....			5	4	5		66,400			66,400					7,571	
Montana:																
Blackfeet (Indian).....	7		115	11			1,779,030	41,098	92,728	1,912,828	1,550	5,920		4,020	5,980	
Flathead (Indian).....	24		107	19			2,414,525	116,444	41,019	2,571,988	486	23,004		5,851	7,288	
Fort Peck (Indian).....						286	1,003,415	2,200		1,005,615		20		1,802	1,872	
Huntley.....			23	12			1,897,552	22,190	12,600	1,932,342	1,660	1,609		13,033	17,668	
Milk River.....	6		2	19			6,664,737	78,210	19,322	6,742,969	10,558	18,500		23,068	30,040	
St. Mary storage.....	75		111	17			2,115,836	16,673	73,455	2,205,964				7,066	10,900	
Sun River.....	35		177	34	43		2,941,320	168,945	372,123	3,472,388	8,042	6,169		19,073	21,714	
Montana-North Dakota: Lower Yellow-																
stone.....	12		78	35			6,602,593	133,017	185,013	6,880,623	21,831			23,131	30,495	
Nebraska-Wyoming: North Platte.....			186	84			11,685,291	632,436	201,560	12,498,267	50,288	61,965	60,210	126,637	151,340	
Nevada: Truckee-Carson.....	65		128	58	20	2,400	9,289,566	252,869	465,826	10,048,261	46,261	47,685		112,202	124,046	26,305
New Mexico:																
Carlsbad.....	25						927,385	63,897	64,007	1,053,289	80,127	7,657	6,251	23,291	24,859	
Hondo.....			15	4			815,353	3,118	35,946	854,446	27,226	7,909		3,530	2,850	

New Mexico-Texas:										
Rio Grande—										
Distribution unit.										
Storage unit.	10	25	5	1,453,391	12,040	1,870	1,467,301	7,312	7,023	13,016
North Dakota:	23	33	44	456,560	90,100	413,400	960,350	12,710	.....	557,500
Bufford-Trenton unit—										
Williston unit.	29	2	29	69,000	50	.....	69,650	.....	940	1,654
Oregon:	4	18	5	219,100	16	.....	219,116	.....	990	2,632
Umatilla.	7	20	18	2,500,500	152,700	51,400	3,064,600	34,600	4,320	52,960
Klamath.	88	46	88	7,799,822	514,363	137,260	3,451,545	7,900	6,727	18,533
South Dakota:	7	38	28	133,750	42,144	7,407,553	7,407,553	1,712	68,465	53,713
Belle Fourche.	55	44	13	1,210,219	137,776	190,946	1,538,941	8,585	18,260	51,323
Utah: Strawberry Valley.	2	35	21	690,500	100,200	50,250	841,250	1,000	1,000	9,150
Washington:										
Yakima—										
Storage unit.	46	63	28	1,610,115	32,724	8,135	1,650,974	38,555	14,032	13,288
Sunnyside unit.	124	50	124	2,907,361	96,942	106,896	3,064,201	9,000	11,250	20,568
Twen unit.	39	68	48	762,258	470,374	238,574	1,561,238	5,423	19,087	27,137
Wyoing: Shoshone.	36	62	25	2,532,711	84,571	316,945	2,964,227	7,265	11,616	123,002
Total June 30, 1915.	754	82	2,554	11,599,284	7,585,948	6,994,136	130,149,368	1,023,368	615,853	2,674,977
Total June 30, 1914.	733	78	2,376	10,432,925	6,668,156	6,067,391	113,168,472	616,493	564,037	1,933,263
Increase.....	51	4	178	15,166,359	917,792	896,745	16,980,896	406,905	51,546	741,714
* Telephone lines leased.										
* Steam plants.										
* No report.										

*General.*—Number farms estimated for projects on completion, when data not available.  
*Arizona, Salt River.*—Area is the irrigable lands within project boundary less the unutilized area. Cement was manufactured in Government mill and used for construction of Roosevelt dam and structures. Work by water users' association was under general supervision of the Reclamation Service. Gila River work was done several years ago by Reclamation Service.

*California, Orland.*—Telephone lines are leased by Reclamation Service.  
*Idaho, Boise.*—Area includes 80,000 acres of vested water-right lands and 25,000 acres under proposed extensions. Tunnels include Arrowrock, 487 feet long, now closed with concrete and log conveyor tunnel 150 feet long.

*Idaho, Minidoka.*—"Concrete" canal structures include 44 "metal" ones.  
*Montana, Milk River.*—Wells include two aggregate depth 40 feet now abandoned.

*Montana, Sun River.*—Buildings include camp buildings reported in preceding year.  
*Nebraska-Wyoming, North Platte.*—Area includes lands of North Platte Canal & Colonization Co. Concrete includes mortar in dams. Telephone lines are leased by the Reclamation Service.

*New Mexico-Texas, Rio Grande.*—Buildings include all camp structures.  
*North Dakota, pumping.*—Area service could supply Williston unit does not include 71 lots, leaving an acreage of less than 5 acres.

*Oregon, Umatilla.*—Number of farms service can supply included number of existing water-right applications.  
*Oregon-California, Klamath.*—Area for "completed" project includes 76,000 acres approved.

*Utah, Strawberry Valley.*—Transmission lines: Of 50 miles; 30 miles to Strawberry tunnel and dam removed.  
*Wyoming, Shoshone.*—Mileage of canals includes 5 miles of distributing canals built and abandoned on account of construction of drains, changes in farm units, etc.

## Summary of equipment June 30, 1915.

Projects.	Air compressors.	Automobiles.	Boats.	Bollers.	Cableways.	Standard-gauge cars.	Narrow-gauge cars.	Concrete cars.	Dump cars.	Other cars.	Concrete mixers.	Stiff-leg derricks.	Guy derricks.	Dredges.	Diamond drills.	Well drills.	Air and steam drills.	Electric drill.
Arizona: Salt River.....	2	9	1	6	.....	12	1	2	12	5	2	2	.....	.....	2	5	3	
Arizona-California: Yuma.....	3	3	1	20	1	116	19	.....	3	2	1	.....	.....	.....	.....	.....	.....	
California: Orland.....	.....	2	1	.....	.....	4	.....	.....	.....	3	2	.....	.....	1	.....	.....	.....	
Colorado:																		
Grand Valley.....	2	1	.....	4	1	58	28	2	.....	4	2	.....	.....	.....	.....	12	1	
Uncompahgre Valley..	5	2	.....	9	.....	78	8	1	.....	3	.....	.....	.....	.....	1	.....	18	
Idaho:																		
Boise—																		
Distribution unit.....	.....	8	2	.....	.....	34	.....	20	.....	6	1	.....	.....	.....	1	.....	.....	
Storage unit.....	2	.....	.....	2	2	44	65	2	.....	.....	.....	.....	1	.....	.....	22	.....	
Minidoka.....	1	4	.....	2	.....	.....	.....	.....	.....	1	2	1	1	1	.....	2	1	
Jackson Lake enlargement	.....	.....	4	10	.....	.....	6	.....	.....	1	.....	2	1	.....	.....	3	.....	
Kansas: Garden City.....	.....	.....	1	.....	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Montana:																		
Blackfoot (Indian).....	.....	1	1	.....	.....	.....	.....	.....	.....	2	1	.....	.....	.....	.....	.....	.....	
Flathead (Indian).....	.....	1	2	.....	.....	6	.....	5	22	.....	2	.....	.....	.....	.....	1	.....	
Fort Peck (Indian).....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3	2	.....	.....	.....	.....	.....	.....	
Huntley.....	.....	1	.....	2	.....	.....	.....	2	6	.....	1	.....	.....	.....	.....	.....	.....	
Milk River.....	.....	1	.....	2	.....	6	3	.....	8	1	1	1	.....	.....	.....	1	.....	
St. Mary storage.....	.....	9	2	.....	.....	3	.....	1	6	3	1	.....	.....	.....	.....	.....	.....	
Sun River.....	1	2	1	2	.....	24	6	5	9	1	2	.....	.....	.....	1	.....	8	
Montana-North Dakota:																		
Lower Yellowstone.....	1	2	2	1	1	12	.....	.....	.....	1	3	3	.....	.....	.....	.....	.....	
Nebraska-Wyoming:																		
North Platte.....	2	2	.....	2	1	6	.....	1	12	.....	.....	.....	4	.....	1	7	.....	
Nevada: Truckee-Carson..	2	2	2	2	1	42	.....	2	4	2	3	2	.....	.....	1	11	1	
New Mexico:																		
Carlsbad.....	.....	1	1	.....	.....	5	.....	.....	.....	2	.....	.....	.....	.....	.....	.....	.....	
Hondo.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
New Mexico-Texas:																		
Rio Grande.....	.....	5	1	.....	1	.....	.....	2	8	5	.....	.....	.....	.....	.....	.....	.....	
Storage unit.....	2	.....	.....	2	3	66	5	20	.....	5	15	8	.....	.....	2	42	.....	
North Dakota: North Dakota pumping.....	.....	.....	2	.....	.....	24	.....	.....	.....	5	.....	.....	.....	.....	.....	.....	.....	
Oklahoma: Lawton.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Oregon: Umatilla.....	.....	.....	1	.....	.....	2	7	.....	6	3	3	.....	.....	.....	.....	.....	.....	
Oregon-California: Klamath.....	.....	2	7	1	.....	12	.....	7	2	1	.....	3	.....	.....	.....	4	.....	
South Dakota: Belle Fourche.....	.....	1	.....	.....	.....	26	22	.....	.....	.....	.....	.....	.....	.....	.....	7	.....	
Utah: Strawberry Valley..	1	.....	1	.....	2	8	12	2	3	3	2	.....	.....	.....	.....	9	.....	
Washington:																		
Okanogan.....	.....	1	.....	.....	.....	.....	4	.....	.....	1	.....	.....	.....	.....	.....	4	.....	
Yakima:																		
Storage unit.....	2	1	9	6	.....	109	4	4	.....	2	2	2	2	1	1	10	.....	
Sunnyside unit.....	.....	2	2	2	.....	.....	.....	.....	.....	4	.....	.....	.....	.....	.....	.....	.....	
Tieton unit.....	1	2	4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Wyoming: Shoshone.....	1	1	2	2	2	.....	16	.....	6	1	.....	.....	.....	.....	.....	10	.....	
Washington and field offices.....	.....	2	3	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4	.....	.....	
Total, June 30, 1915..	28	61	61	90	12	229	564	120	76	118	68	51	37	5	11	7	175	6
Total, June 30, 1914..	27	58	58	84	18	264	621	132	81	92	60	113	.....	5	9	8	172	.....

Summary of equipment June 30, 1915—Continued.

Projects.	Electric generators.		Electric motors.		Electric-light plants.	Gasoline engines.		Steam engines.		Drag-line excavators.	Other excavators.	Elevating graders.	Road graders.	Horses and mules.	Hydraulic rams.	Locomotives, electric.	Locomotives, steam.
	K.	W.	K.	W.			Hp.		Hp.								
Arizona: Salt River.....	4	385	30	442	1	10	43	3	62	1	1	1	1	53	1	1	...
Arizona-California: Yuma.	2	27	1	10	1	16	385	24	1,000	2	1	1	1	70	1	1	4
California: Orland.....	1	1	1	3	1	4	19	1	1	1	1	1	1	5	1	1	...
Colorado:																	
Grand Valley.....	7	538	33	1,141	1	5	43	3	435	1	1	1	1	40	1	1	5
Uncompahgre Valley.	4	350	5	112	2	1	12	10	775	1	1	1	1	16	1	1	3
Idaho:																	
Boise—																	
Distribution unit.	1	1	5	7	1	7	35	1	12	1	3	1	1	36	1	1	2
Storage unit.....	4	1,950	73	2,000	1	1	1	1	40	1	1	1	3	7	1	1	7
Minidoka.....	1	10	9	73	1	5	159	1	10	3	1	1	1	41	1	1	...
Jackson Lake enlarge-	1	50	1	1	1	3	60	10	345	1	2	1	1	27	1	1	...
ment.....																	
Kansas: Garden City.....	6	470	16	340	1	5	33	1	1	1	1	1	1	1	1	1	...
Montana:																	
Blackfeet (Indian).....	1	1	1	1	1	2	19	1	1	1	1	1	1	19	1	1	...
Flathead (Indian).....	1	1	1	1	1	4	13	1	40	1	1	1	1	50	1	1	...
Fort Peck (Indian).....	1	1	1	1	1	1	1	1	1	1	1	1	1	22	1	1	...
Huntley.....	1	1	1	1	1	4	12	1	1	1	1	1	1	15	1	1	...
Milk River.....	1	15	1	1	1	2	4	7	104	1	1	1	1	30	1	1	...
St. Marys storage.....	2	17	1	1	3	1	30	9	345	1	1	1	2	208	3	1	...
Sun River.....	1	1	10	323	1	3	24	4	160	1	1	1	1	60	1	1	2
Montana-North Dakota:																	
Lower Yellowstone.....	1	1	1	1	1	2	8	5	180	1	1	1	1	31	1	1	...
Nebraska-Wyoming:																	
North Platte.....	1	45	2	13	1	5	40	10	207	1	1	1	1	109	1	1	...
Nevada: Truckee-Carson.	3	1,500	24	2,255	1	5	30	3	58	2	1	1	1	49	1	1	4
New Mexico:																	
Carlsbad.....	1	1	1	1	1	3	35	1	1	1	1	1	1	2	1	1	...
Hondo.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	...
New Mexico-Texas:																	
Rio Grande.....	1	1	2	8	1	5	56	3	45	2	1	1	1	18	1	1	...
Storage unit.....	5	1,530	78	2,746	1	2	33	2	20	1	1	1	1	29	1	1	4
North Dakota: North Da-																	
kota pumping.....	1	1	1	2	1	1	1	1	15	1	1	1	1	3	1	1	...
Oregon: Umatilla.....	1	1	1	1	1	8	43	3	70	1	1	1	1	19	1	1	...
Oregon-California: Klamath.																	
South Dakota: Belle																	
Fourche.....	1	3	1	1	1	3	22	1	30	1	1	1	1	63	1	1	1
Utah: Strawberry Valley.	3	163	2	60	1	1	32	1	1	1	1	1	1	12	1	1	3
Washington:																	
Okanogan.....	2	374	2	300	1	1	2	1	1	1	1	1	1	6	1	1	...
Yakima:																	
Storage unit.....	4	282	19	375	2	3	28	8	176	1	1	1	1	142	1	1	6
Sunnyside unit.....	1	1	1	1	1	4	40	2	45	1	1	1	1	3	1	1	...
Tieton unit.....	1	2	1	1	1	2	10	4	48	1	1	1	1	6	1	1	...
Wyoming: Shoshone.....	1	5	1	5	1	9	55	1	40	1	1	1	1	21	3	1	...
Washington and field																	
offices.....	1	1	1	1	1	1	4	1	1	1	1	1	1	1	1	1	...
Total, June 30, 1915.	53	7,716	314	10,215	17	129	1,348	119	4,296	24	9	8	29	1,244	15	12	30
Total, June 30, 1914.	55	9,221	317	11,064	17	121	1,450	119	4,011	28	12	12	27	1,411	12	12	41

## Summary of equipment June 30, 1915—Continued.

Projects.	Motor cycles.	Pile drivers.	Flows.	Pumps.	Rock crushers.	Rollers.	Fresno scrapers.	Slip scrapers.	Wheel scrapers.	Sleighs and sleds.	Sprinklers.	Steam shovels.	Traction engines.	Dump wagons.	Heavy freight wagons.	Light freight wagons.	Spring wagons.
Arizona: Salt River.....	21	.....	41	38	.....	.....	123	117	6	.....	.....	.....	.....	.....	7	76	12
Arizona-California: Yuma.....	2	1	58	52	2	.....	136	25	13	.....	1	2	.....	4	25	14	13
California: Orland.....	1	1	8	7	.....	.....	10	8	4	.....	.....	.....	.....	.....	3	3	4
Colorado:																	
Grand Valley.....	.....	1	17	9	2	.....	27	83	16	.....	3	.....	.....	.....	6	3	5
Uncompahgre Valley.....	2	4	21	15	1	.....	27	151	38	2	.....	.....	.....	4	17	.....	4
Idaho:																	
Boise—																	
Distribution unit.....	5	.....	35	24	.....	.....	74	68	14	.....	.....	1	.....	.....	11	11	17
Storage unit.....	.....	1	11	14	3	.....	3	33	8	1	.....	1	.....	.....	12	.....	2
Minnesota:																	
Mnidoaka.....	4	2	7	11	.....	.....	9	12	10	1	.....	.....	.....	.....	2	10	12
Jackson Lake enlargement.	.....	2	3	5	.....	.....	11	75	24	8	.....	.....	.....	20	2	2	2
Kansas: Garden City.....	.....	.....	3	31	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Montana:																	
Blackfeet (Indian).....	1	1	28	5	.....	.....	.....	41	17	.....	.....	.....	.....	.....	10	2	2
Flathead (Indian).....	1	.....	20	1	.....	2	51	38	18	11	.....	1	.....	.....	14	11	9
Fort Peck (Indian).....	1	1	28	4	.....	.....	103	7	6	.....	.....	.....	.....	.....	4	9	3
Huntley.....	1	.....	11	7	.....	.....	2	50	10	.....	.....	.....	.....	.....	3	3	5
Milk River.....	1	3	10	13	.....	.....	17	12	17	6	.....	.....	.....	.....	8	4	12
St. Marys storage.	2	1	36	5	.....	1	30	43	.....	8	.....	2	1	31	18	6	4
Sun River.....	2	1	6	14	.....	.....	9	10	17	7	.....	1	1	12	12	7	5
Montana-North Dakota:																	
Lower Yellowstone.....	1	3	12	6	.....	.....	13	49	14	7	.....	.....	.....	4	8	4	5
Nebraska-Wyoming:																	
North Platte.....	1	1	20	25	1	.....	19	74	53	.....	.....	.....	.....	17	6	32	19
Nevada: Truckee-Carson.	1	1	16	38	1	1	56	36	9	.....	.....	1	1	10	16	6	6
New Mexico:																	
Carlsbad.....	.....	.....	7	4	.....	1	6	29	25	.....	1	.....	.....	15	1	.....	1
Hondo.....	.....	.....	.....	1	.....	.....	.....	5	.....	.....	.....	.....	.....	.....	.....	1	1
New Mexico-Texas:																	
Rio Grande.....	.....	1	7	12	.....	.....	12	2	2	.....	.....	.....	.....	.....	.....	6	7
Storage unit.....	.....	.....	3	20	5	1	.....	20	10	.....	1	1	.....	27	18	4	2
North Dakota: North Dakota pumping.	.....	.....	2	.....	.....	.....	.....	8	.....	.....	.....	.....	.....	.....	1	1	2
Oregon: Umatilla.....	.....	.....	10	19	.....	.....	31	67	3	1	.....	.....	.....	.....	7	3	3
Oregon-California: Klamath.	2	.....	19	22	1	1	33	22	22	3	.....	.....	.....	.....	13	6	9
South Dakota: Belle Fourche.	.....	.....	18	5	.....	.....	17	30	24	.....	.....	1	1	13	6	16	10
Utah: Strawberry Valley.	.....	.....	8	6	1	.....	12	15	8	4	.....	.....	.....	2	1	8	3
Washington:																	
Okanogan.....	.....	2	4	4	1	.....	2	14	8	1	.....	.....	.....	.....	.....	1	3
Yakima:																	
Storage unit.....	1	2	16	17	1	1	25	28	24	14	.....	2	2	9	20	5	4
Sunnyside unit.....	.....	.....	9	12	.....	.....	18	28	11	.....	.....	.....	.....	.....	6	2	2
Tieton unit.....	.....	.....	6	4	.....	.....	3	13	1	1	.....	.....	.....	.....	1	1	3
Wyoming: Shoshone.	2	.....	25	19	.....	.....	21	33	12	.....	.....	.....	.....	.....	.....	17	7
Washington and field offices	.....	.....	.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total, June 30, 1915.	52	29	525	470	19	8	900	1,246	442	75	6	13	6	176	253	282	189
Total, June 30, 1914.	53	30	457	455	20	10	824	1,202	441	85	3	13	7	158	262	304	203

## Summary of employees June 30, 1915—Continued.

Projects.	Employees, 1915.												Average all, June. <sup>1</sup>	Approximate average wages per day for common labor.
	Average, January to June.						Maximum, January to June. <sup>1</sup>							
	Government force.				Contractors' force.	Grand total.	Government force.				Contractors' force.	Grand total.		
	Classified, educational.	Classified, non-educational.	Others.	Total.			Classified, educational.	Classified, non-educational.	Others.	Total.				
Arizona: Salt River.....	30	140	350	520	.....	520	32	160	500	692	.....	692	630	\$1.90
Arizona-California:														
Yuma.....	11	61	561	633	.....	633	11	75	1,062	1,148	.....	1,148	499	2.00
California: Orland.....	6	7	83	96	6	102	6	15	168	189	20	209	122	2.40
Colorado:														
Grand Valley.....	15	53	364	432	185	617	16	62	632	710	290	1,000	505	2.31
Uncompahgre Valley.....	14	50	154	218	.....	218	14	65	266	335	.....	335	219	2.61
Idaho:														
Boise—														
Distribution unit.....	39	250	650	939	.....	939	42	304	1,197	1,543	.....	1,543	887	2.50
Storage unit.....	8	105	379	492	.....	492	10	125	551	686	.....	686	390	2.50
Minidoka.....	18	116	210	344	.....	344	19	156	443	618	.....	618	328	2.25
Jackson Lake enlargement.....	5	32	67	104	.....	104	8	64	153	225	.....	225	202	2.50
Kansas: Garden City.....	.....	.....	1	1	.....	1	.....	.....	1	1	.....	1	1	2.40
Montana:														
Blackfoot (Indian) unit.....	1	.....	4	5	.....	5	1	.....	10	11	.....	11	6	2.40
Flathead (Indian).....	9	19	26	54	21	75	10	23	50	83	40	123	105	2.25
Fort Peck (Indian).....	2	1	2	5	.....	5	2	3	5	10	.....	10	5	2.50
Huntley.....	9	11	35	55	.....	55	10	19	124	153	.....	153	152	2.24
Milk River.....	20	11	28	59	128	187	22	12	50	84	250	334	210	2.00
St. Mary storage.....	14	26	214	254	172	426	16	38	390	444	250	694	603	2.40
Sun River.....	23	20	30	73	340	413	25	23	51	99	479	578	516	2.18
Montana-North Dakota: Lower Yellowstone.....	5	10	23	38	.....	38	5	14	42	61	.....	61	30	2.25
Nebraska - Wyoming: North Platte.....	15	48	105	168	34	202	16	99	192	307	126	433	335	2.40
Nevada: Truckee-Carson.....	11	31	185	227	.....	227	14	31	263	328	.....	328	170	2.50
New Mexico:														
Carlsbad.....	3	10	275	288	35	323	3	10	381	394	53	447	163	1.50
Hondo.....	.....	1	6	7	.....	7	.....	1	28	29	.....	29	3	1.76
New Mexico-Texas:														
Rio Grande.....	26	76	650	752	.....	752	29	111	1,250	1,390	.....	1,390	513	1.50
Storage unit.....	15	65	859	939	.....	939	18	99	1,333	1,450	.....	1,450	572	1.67
North Dakota: North Dakota pumping.....	3	6	9	18	.....	18	3	8	9	20	.....	20	16	2.50
Oklahoma: Lawton.....	1	3	.....	4	.....	4	1	5	.....	6	.....	6	4	2.00
Oregon: Umatilla.....	12	25	163	200	15	215	12	30	238	280	15	295	295	2.40
Oregon-California: Klamath.....	6	20	229	255	41	296	6	25	475	506	65	571	182	2.48
South Dakota: Belle Fourche.....	8	15	70	93	14	107	8	35	125	168	16	184	164	2.50
Utah: Strawberry Valley.....	15	51	75	141	600	741	15	60	218	293	900	1,193	1,193	2.50
Washington:														
Okanogan.....	4	8	30	42	.....	42	4	8	97	109	.....	109	82	2.20
Yakima—														
Storage unit.....	12	33	300	395	.....	395	13	121	494	628	.....	628	628	2.20
Sunnyside unit.....	13	70	250	333	100	433	15	91	300	406	200	606	396	2.00
Tieton unit.....	5	12	15	32	.....	32	5	18	30	53	.....	53	43	2.20
Wyoming: Shoshone.....	11	27	87	125	23	148	12	34	116	162	33	195	136	2.40
Washington and field offices.....	186	30	39	255	.....	255	225	32	50	307	.....	307	265	2.45
Total, June 30, 1915.....	575	1,498	6,528	8,596	1,714	10,310	648	1,976	11,304	13,928	2,737	16,665	10,520	2.26
Total, June 30, 1914.....	514	1,207	5,964	7,675	854	8,437	563	1,641	9,458	11,662	1,637	13,299	9,228	2.23

<sup>1</sup> Totals of all projects are not necessarily the number at any one time.<sup>2</sup> See p. 430 for details showing average in June.



*Summary of equipment and employees June 30, 1915—Continued.*

## NOTES.

- Arizona, Salt River.*—Boat is a launch. Narrow-gauge cars are ore cars. Pumps of different sizes.
- Arizona-California, Yuma.*—In addition to the above, one gasoline motor car. Pumps of different sizes.
- California, Orland.*—Pumps include one, each, 6-inch centrifugal, 3-inch diaphragm, 4-inch triplex, and 4 tank pumps.
- Colorado, Grand Valley.*—Pumps include one, each, 6-inch, 4 by 6 inch triplex, 5 by 8 inch triplex, and two, each, 4-inch, 8-inch, and 12-inch pumps. Sprinklers are wagon tanks. Wages: Contractors, \$2.12½; United States, \$2.50 per day. Contractors have large equipment, including 362 horses.
- Colorado, Uncompaghe Valley.*—Pumps, 3-inch, 4-inch, 5-inch, 6-inch, and 7-inch. Wages range from \$2.50 to \$2.72 per day.
- Idaho, Boise (distribution unit).*—Derrick is a hoisting derrick. In addition to above, 1 ditcher, 1 sawmill outfit, 6 tongue scrapers, and 1 gasoline speeder. Other excavators are electric.
- Idaho, Boise (storage unit, Arrowrock).*—Graders are Bagley graders. Locomotives, 3 standard gauge, 4 narrow gauge. In addition to above, 1 ice plant, 1 motor car, 1 sawmill, and 1 sand-cement plant.
- Idaho, Mtnidoka.*—Pumps are 3-2-inch centrifugal, 5-2-inch tank, and 3-4-inch diaphragm.
- Idaho-Wyoming, Jackson Lake enlargement.*—Includes Snake River storage.
- Montana, Flathead.*—Other carts include 7 concrete carts. Rollers are horse rollers. Contractors have large equipment, including 100 horses.
- Montana, Hundley.*—Pumps include one 5-inch centrifugal pump.
- Montana, Milk River.*—Pumps include 2 over 6 inches and 10 under 3 inches. Contractors have large equipment, including 150 horses.
- Montana, St. Mary storage unit.*—Not included in above, 2 tank wagons. Contractors also have large equipment, including 185 horses.
- Montana, Sun River.*—Narrow-gauge cars include 23 4-yard dump and 1 flat car. Locomotives are narrow-gauge. Not included in above, 2 boiler trucks and 11 transformers; total kilowatts, 58. Contractors also have large equipment, including 440 horses. Wages: Contractors, \$2.12; United States, \$2.24 per day.
- Montana-North Dakota, Lower Yellowstone.*—Pumps include one 12-inch centrifugal, 3-3-inch and 2 lift and tank pumps.
- Nebraska-Wyoming, North Platte.*—Not included in above, 1 cesspool wagon.
- Nevada, Truckee-Carson.*—Not included in above, 1 track speeder, 3 back-up scrapers. Shovel is an electric one.
- New Mexico, Carlsbad.*—Pumps include 2-5-inch, 7 horsepower; one 3-inch suction, and one 4-inch suction pump.
- New Mexico, Hondo.*—Pump is a 3-inch cylinder.
- New Mexico-Texas, Rio Grande.*—Car is push car. Pumps include one 10-inch, two 6-inch, one 4-inch, and 8 small hand pumps. In addition, United States has rented 160 horses and other equipment.
- New Mexico-Texas, Elephant Butte storage.*—Not included in above, 1 cement gun, 2 channellers, 2 drill sharpeners, 1 Calyx drill, 1 grouting machine, 1 motor car, 134 skips, one 7-ton machinery wagon.
- North Dakota, North Dakota pumping.*—Boats are the pumping barges.
- Oregon, Umatilla.*—Concrete mixers include 2 steam and 1 hand mixers. Pumps include sewer, pitcher, duplex, centrifugal, Red Jacket, and tank pumps.
- Oregon-California, Klamath.*—Pumps include 3-inch, 6-inch, 7-inch, and others. Contractors' force was only engaged part of two months.
- South Dakota, Belle Fourche.*—Pumps are 2-inch, 2½-inch, 3-inch, and 4-inch sizes. Contractors have small equipment, including 34 horses.
- Tah, Strawberry Valley.*—Other carts are concrete carts. Contractors have large equipment, including 376 horses.
- Washington, Okanogan.*—Drills are steam drills. Pile drivers are hammers. Pumps include No. 2 diaphragm and 5-inch piston pump.
- Washington, Yakima storage.*—Drills: 10 are pneumatic. Boats: 3 launches, 6 row. Pumps: 4-inch, 5-inch, 6-inch, etc.; also pulsometer.
- Washington, Sunnyside unit.*—Pumps: 9 hand, 1 small power, 2-4 by 6-inch centrifugal.
- Washington, Tieton unit.*—One automobile is a 1-ton motor truck. Pumps: 2-2-inch, 1-3-inch, 1-4-inch. In addition to above, 1 donkey engine.
- Wyoming, Shoshone.*—Concrete cars are 20-inch gauge. Drills: 4 rock and 6 pneumatic. In addition to above, 1 cement gun. Contractors' force worked only 5 months.
- Washington and field offices.*—Washington office, 99 to 112 employees (exclusive of consulting engineers).
- Colorado River Basin.*—3 boats, 2 boilers, 3 diamond drills, and 2 duplex pumps, and average 32 to 35 employees. Wages, \$2.50.
- Denver office, chief of construction: 27 employees in June.
- Denver cement inspection: 6 employees.
- Oregon cooperative work: 1 diamond drill; 1 Calyx shot; 1 gasoline engine, 4 horsepower; 1 duplex pump; and 16 to 32 employees. Wages, \$2.40.
- California cooperative work: 4 employees; no equipment.
- Billings office: 2 employees.
- Chief electrical engineer's: 11 to 13 employees.
- Transportation office: 17 to 18 employees.
- Six district offices, 4 to 12 employees each. Two automobiles are at the Yakima manager's office.

## CROP STATISTICS AND OPERATION AND MAINTENANCE DATA.

Acreage cropped and irrigated on reclamation projects in 1914.<sup>1</sup>

State and project.	Cereals.						Other grain and seed.						Hay and forage.									
	Barley.	Corn, In- clud.	Oats.	Rye.	Wheat.	Total.	Alfalfa seed.	Clover seed.	Corn sor- ghum.	Flaxseed.	Millet seed.	Other.	Total.	Alfalfa hay.	Clover hay.	Corn fodder.	Peas.	Other hay.	Other forage.	Pasture.	Total.	
Arizona: Salt River.....	17,066	2,315	1,930		9,744	31,055			12,651				12,651	86,733		628		1,037		22,261	110,659	
Arizona-California: Yuma.....	1,653	257			570	2,480	5,485		3,066				3,066	10,436				671		551	7,038	18,706
California: Orland.....									146				146	8,817							4,069	9,916
Colorado: Uncompahgre Valley.....	162	400	6,166	26	5,244	11,998	20	3					23	12,028	185	186		188			835	13,814
Idaho.....																						
Idaho: Boise.....																						
Idaho: Farms reported.....	1,936	6,836	5,040	126	11,096	25,054	240	6,334			28	1	6,003	18,128	6,110	714	41	334			4,816	30,143
Idaho: Farms not reported.....	562	1,982	1,471	37	3,226	7,278	70	1,838			8		1,916	5,267	1,776	207	12	97			1,367	8,755
Minnesota.....																						
Minnesota: Gravity unit.....	666	442	4,391	148	4,633	10,280	5	31					36	19,028	914	39	151	191	9	5,397	25,729	
Minnesota: South side pumping unit.....	874	11	3,774	6	7,407	12,072	5	67					72	12,385	123	32	803	7	8	3,164	16,527	
Montana.....																						
Montana: Hundley.....	363	497	3,226	9	1,671	5,766	69						69	6,038	36	56	51	321			5	6,502
Montana: Milk River.....	112		405		630	1,146	3						55	3,322				616			5	943
Montana: Sun River.....	376	1	2,123	14	518	3,032	10				4		14	2,627				306		3	377	3,318
Montana-North Dakota: Lower Yellowstone.....																						
Nebraska-Wyoming: North Platte.....	407	107	575		1,071	2,160			157				157	2,884				90			108	3,082
Nevada: Truckee-Carson.....	2,261	6,024	7,017	245	600	16,156	922				43		965	32,464				363		220	2,873	35,830
New Mexico.....	1,329		417		1,446	3,192								21,556				1,564			19,398	42,518
New Mexico: Carlsbad.....	5	496			2	503	275		559				834	7,637				49			374	8,040
New Mexico: Hondo.....	21					21							21	668				6			20	1,284
New Mexico-Texas: Rio Grande.....	62	3,772	677		1,550	6,161			341				341	18,420						357	419	18,991
North Dakota: North Dakota pump- ing.....	17	13	16	1	25	72							5	865				23			25	912
Oregon: Umatilla.....	53			3	7	62							1	2,048				111			542	2,787
Oregon-California: Klamath.....	4,066		2,268	137	1,466	7,837								9,334				2,399			4,166	15,899
South Dakota: Belle Fourche.....	1,448	4,415	6,392	14	7,885	20,154	1,416	9			58		1,483	9,745	52	880		2,236			3,604	16,517
Washington: Okanogan.....						70								1,095				200			113	1,473
Yakima.....																						
Yakima-Sunnyside unit.....		6,004			481	6,485								26,164	802			1,347			2,448	30,761
Wyoming: Teton unit.....	500	1,522	740		1,125	3,887	8						68	5,370	430			840			580	7,990
Wyoming: Shoshone.....	680	3	3,826		1,976	6,735	83	23					107	12,627	17		2	94			972	13,714
Total.....	34,795	35,240	50,474	766	62,482	183,756	8,611	8,367	16,763	217	142	1	34,100	329,676	10,464	3,405	1,253	13,303	1,158		85,041	444,300

<sup>1</sup> Data are for calendar year (irrigation season) except for Salt River project, Arizona, data are for corresponding agricultural year, October, 1913, to September, 1914.

\* Irrigated area known; other figures assumed in same proportion as for farms reported.

## Acreage cropped and irrigated on reclamation projects in 1914—Continued.

State and project.	Vegetables and truck.					Fruits and nuts.								
	Beans.	Onions.	Pota- toes, white.	Pota- toes, sweet.	Truck.	Total.	Apples.	Citrus fruit.	Peaches.	Pears.	Prunes.	Small fruit.	Other.	Total.
Arizona: Salt River.....	567		232		3,851	4,650		707				1,060		3,013
Arizona-California: Yuma.....	128				314	442						22		40
California: Orland.....					72	72		87				88	90	287
Colorado: Uncompahgre Valley.....	105	234	4,557		97	4,993	1,660		158	32	22			1,960
Idaho: Boise—														
Farms reported.....	442	8	1,107	9	562	2,128	211		42		9	104		366
Farms not reported.....	128	2	322	3	164	619	61		12		3	30		106
Minnesota—														
Gravity unit.....	5	15	1,837		338	2,195	320			10	2	42		374
South Side pumping unit.....	9	13	2,298		727	3,047	10					3		13
Montana:														
Huntley.....	40		120		297	457								
Milk River.....			14		2	16								
Sun River.....	1		115		78	192	1					1		2
Montana-North Dakota: Lower Yellowstone.....			54		81	135								
Nebraska-Wyoming: North Platte.....			1,097		305	1,402								
Nevada: Truckee-Carson.....		20	283		646	949								
New Mexico:														
Carlsbad.....		2		4	30	36			57				7	57
Hondo.....					2,032	2,352	57					76		64
New Mexico-Texas: Rio Grande.....	320				20	57	447							523
North Dakota: North Dakota pumping.....		1	36		36	57								
Oregon: Umatilla.....		3	61		55	119	53		118	8		65		244
Oregon-California: Klamath.....			461		130	591								13
South Dakota: Belle Fourche.....	42		195		159	396								
Washington:														
Okanogan.....	20	3	95		79	197	1,476		175	35	4	26	75	1,791
Yakima—														
Sunnyside unit.....			3,828		597	4,425	7,168		1,165	857	188	598		9,964
Tieton unit.....	75	70	3,380		280	3,755	620		215	140		32		1,007
Wyoming: Shoshone.....	4	1	87		131	223	1					1		2
Total.....	1,886	372	20,179	16	10,997	33,460	12,085	704	1,942	1,082	228	2,136	172	19,826

State and project.	Miscellaneous.					Total cropped.	Irrigated, not cropped.					Total irrigated.
	Beets, sugar.	Cotton.	Hops.	Cane.	Other.		Young alfalfa.	Young fruit.	Fall plowing.	Miscellaneous.	Duplicated areas.	
Arizona: Salt River.....	11,501			901	115	12,517		696		2,615		173,080
Arizona-California: Yuma.....	2,268				3	2,268				2,639		25,207
California: Orland.....					217	1,082		630		184		7,364
Colorado: Uncompagné Valley.....	865						4,353	971	828	17	5,387	33,873
Idaho:												
Boise—												
Farms reported.....	7			19	3	29	6,259	6,096	741	54	6,532	64,767
Farms not reported.....	2			6	1	9	1,815	1,775	220	15	1,900	18,823
Minnesota—												
Gravity unit.....	583				13	576	52	766	1,117	1,657	1,529	45,730
South Side pumping unit.....	1,797					1,797	16	502	364	1,457	2,047	35,788
Montana:												
Runney.....	4,274					4,274						17,068
Milk River.....												2,201
Sun River.....	1					1	2,163			38		6,613
Montana-North Dakota: Lower Yellowstone.....							6,601			52		5,743
Nebraska-Wyoming: North Platte.....	5,083				87	5,083	59,532			122	3,892	60,532
Nevada: Truckee-Carson.....							39,285	231				39,516
New Mexico:												
Carlsbad.....	5	1,303		208		1,516	940	238		781		12,690
Elmido.....				36		36	1,172			82		2,294
New Mexico-Texas: Rio Grande.....										165		28,443
North Dakota: North Dakota pumping.....								975				1,054
Oregon: Umatilla.....							1,045					1,102
Oregon-California: Klamath.....					27	27	439	1,274		530	154	2,446
South Dakota: Belle Fourche.....	37				45	82	4,940	91		15	4,301	37,454
Washington:												
Okanogan.....												
Yakima.....					42	42	328	4,260	178	882	1,088	7,740
Wyoming:												
Sunnyside unit.....			187			187	1,776	8,266		8,337	3,600	64,052
Teton unit.....			286			286	6,280		105	1,695	3,400	20,600
Wyoming: Shoshone.....	119				5	124	1,917	134	689	153	1,577	22,286
Total.....	12,753	15,072	473	1,170	558	30,026	34,323	33,185	4,242	21,495	35,407	761,271

<sup>1</sup> Includes 1,387 acres not reported in detail.

*Average yields per acre of irrigated crops harvested on reclamation projects in 1914.<sup>1</sup>*

State and project.	Cereals.					Other grain and seed.					Hay and forage.					
	Barley.	Corn, Indian.	Oats.	Rye.	Wheat.	All.	Alfalfa seed.	Clover seed.	Corn, sor- ghum.	Flax seed.	Millet seed.	Alfalfa hay.	Clover hay.	Other hay.	Corn fodder.	Field peas.
Arizona: Salt River.....	Bushels. 25	Bushels. 20	Bushels. 35	Bushels. 16	Bushels. 27	Bushels. 32	Bushels. 1.3	Bushels. 0.7	Bushels. 25	Bushels. 33	Bushels. 3	Tons. 3.1	Tons. 1.5	Tons. 1.6	Tons. 0.6	Bushels. 3
Arizona-California: Yuma.....	Bushels. 30	Bushels. 53	Bushels. 33	Bushels. 22	Bushels. 28	Bushels. 38	Bushels. 3.8	Bushels. 40	Bushels. 33	Bushels. 33	Bushels. 3.1	Tons. 1.6	Tons. 1.6	Tons. 1.6	Tons. 0.6	Bushels. 3
California: Orland.....	Bushels. 23	Bushels. 33	Bushels. 36	Bushels. 16	Bushels. 27	Bushels. 32	Bushels. 1.3	Bushels. 0.7	Bushels. 33	Bushels. 33	Bushels. 3.1	Tons. 1.6	Tons. 1.6	Tons. 1.6	Tons. 0.6	Bushels. 3
Colorado: Uncompahgre Valley.....	Bushels. 22	Bushels. 19	Bushels. 25	Bushels. 10	Bushels. 19	Bushels. 20	Bushels. 1.7	Bushels. 1.9	Bushels. 25	Bushels. 25	Bushels. 3	Tons. 3.6	Tons. 1.6	Tons. 1.1	Tons. 3	Bushels. 8
Boise.....	Bushels. 30	Bushels. 21	Bushels. 30	Bushels. 17	Bushels. 19	Bushels. 25	Bushels. 1	Bushels. 1	Bushels. 25	Bushels. 25	Bushels. 3	Tons. 3.4	Tons. 3.3	Tons. 2.1	Tons. 2.8	Bushels. 22
Minnesota:.....	Bushels. 23	Bushels. 17	Bushels. 25	Bushels. 10	Bushels. 17	Bushels. 20	Bushels. 2	Bushels. 5	Bushels. 25	Bushels. 25	Bushels. 3.1	Tons. 3.4	Tons. 3.4	Tons. 2.6	Tons. 2.6	Bushels. 18
Montana:.....	Bushels. 18	Bushels. 24	Bushels. 30	Bushels. 3	Bushels. 23	Bushels. 27	Bushels. 6.1	Bushels. 2	Bushels. 25	Bushels. 25	Bushels. 2.9	Tons. 2.9	Tons. 1.7	Tons. 1.3	Tons. 1.5	Bushels. 8
Montana-North Dakota: Lower Yellow- stone.....	Bushels. 6	Bushels. 21	Bushels. 15	Bushels. 15	Bushels. 15	Bushels. 21	Bushels. 2	Bushels. 2	Bushels. 25	Bushels. 25	Bushels. 1.9	Tons. 2.1	Tons. 1.8	Tons. 1	Tons. 1	Bushels. 30
Montana-North Dakota: Lower Yellow- stone.....	Bushels. 25	Bushels. 85	Bushels. 30	Bushels. 19	Bushels. 22	Bushels. 28	Bushels. 2.4	Bushels. 2	Bushels. 25	Bushels. 25	Bushels. 2.1	Tons. 2.1	Tons. 1.8	Tons. 1	Tons. 1	Bushels. 30
Nebraska: Wyoming: North Platte.....	Bushels. 20	Bushels. 33	Bushels. 31	Bushels. 6	Bushels. 20	Bushels. 23	Bushels. .9	Bushels. .9	Bushels. 12	Bushels. 12	Bushels. 1.5	Tons. 2.5	Tons. 2.2	Tons. 1.6	Tons. 1	Bushels. 22
Nebraska: Truckee-Carson.....	Bushels. 23	Bushels. 15	Bushels. 21	Bushels. 6	Bushels. 16	Bushels. 19	Bushels. .9	Bushels. .9	Bushels. 12	Bushels. 12	Bushels. 1.5	Tons. 2.2	Tons. 2.2	Tons. 1.9	Tons. 1	Bushels. 22
New Mexico:.....	Bushels. 25	Bushels. 25	Bushels. 31	Bushels. 6	Bushels. 20	Bushels. 25	Bushels. .9	Bushels. .9	Bushels. 12	Bushels. 12	Bushels. 1.5	Tons. 2.2	Tons. 2.2	Tons. 1.9	Tons. 1	Bushels. 22
Carlsbad.....	Bushels. 25	Bushels. 25	Bushels. 31	Bushels. 6	Bushels. 20	Bushels. 25	Bushels. .9	Bushels. .9	Bushels. 12	Bushels. 12	Bushels. 1.5	Tons. 2.2	Tons. 2.2	Tons. 1.9	Tons. 1	Bushels. 22
Hondo.....	Bushels. 24	Bushels. 24	Bushels. 30	Bushels. 15	Bushels. 15	Bushels. 25	Bushels. 1.1	Bushels. 1.1	Bushels. 25	Bushels. 25	Bushels. 2.5	Tons. 2.5	Tons. 2.5	Tons. 3	Tons. 1	Bushels. 22
New Mexico-Texas: Rio Grande.....	Bushels. 32	Bushels. 18	Bushels. 44	Bushels. 30	Bushels. 30	Bushels. 34	Bushels. 24	Bushels. 22	Bushels. 22	Bushels. 22	Bushels. 2.6	Tons. 3.6	Tons. 3.6	Tons. 2.1	Tons. 2	Bushels. 22
North Dakota: North Dakota pumping.....	Bushels. 26	Bushels. 56	Bushels. 42	Bushels. 18	Bushels. 18	Bushels. 32	Bushels. 18	Bushels. 10	Bushels. 10	Bushels. 10	Bushels. 2.6	Tons. 3.6	Tons. 3.6	Tons. 2.1	Tons. 2	Bushels. 22
Oregon: Umatilla.....	Bushels. 35	Bushels. 35	Bushels. 34	Bushels. 14	Bushels. 39	Bushels. 34	Bushels. 1.5	Bushels. 1.5	Bushels. 1.5	Bushels. 1.5	Bushels. 2.4	Tons. 3.7	Tons. 2.9	Tons. 2.9	Tons. 1	Bushels. 22
Oregon-California: Klamath.....	Bushels. 35	Bushels. 34	Bushels. 34	Bushels. 9	Bushels. 19	Bushels. 31	Bushels. 2.4	Bushels. 2.4	Bushels. 2.4	Bushels. 2.4	Bushels. 2.4	Tons. 2.4	Tons. 2.4	Tons. 1.5	Tons. 1.5	Bushels. 22
South Dakota: Belle Fourche.....	Bushels. 24	Bushels. 24	Bushels. 33	Bushels. 17	Bushels. 14	Bushels. 23	Bushels. 2.3	Bushels. 1.5	Bushels. 1.5	Bushels. 1.5	Bushels. 2.1	Tons. 2.1	Tons. .9	Tons. .9	Tons. 1.3	Bushels. 22
Washington:.....	Bushels. 24	Bushels. 24	Bushels. 33	Bushels. 17	Bushels. 14	Bushels. 23	Bushels. 2.3	Bushels. 1.5	Bushels. 1.5	Bushels. 1.5	Bushels. 2.1	Tons. 2.1	Tons. .9	Tons. .9	Tons. 1.3	Bushels. 22
Okanogan.....	Bushels. 25	Bushels. 25	Bushels. 33	Bushels. 17	Bushels. 14	Bushels. 23	Bushels. 2.3	Bushels. 1.5	Bushels. 1.5	Bushels. 1.5	Bushels. 2.1	Tons. 2.1	Tons. .9	Tons. .9	Tons. 1.3	Bushels. 22
Yakima.....	Bushels. 25	Bushels. 25	Bushels. 33	Bushels. 17	Bushels. 14	Bushels. 23	Bushels. 2.3	Bushels. 1.5	Bushels. 1.5	Bushels. 1.5	Bushels. 2.1	Tons. 2.1	Tons. .9	Tons. .9	Tons. 1.3	Bushels. 22
Sunnyside unit.....	Bushels. 28	Bushels. 28	Bushels. 41	Bushels. 21	Bushels. 21	Bushels. 29	Bushels. 12	Bushels. 3	Bushels. 3	Bushels. 3	Bushels. 5	Tons. 3.5	Tons. 3	Tons. 3	Tons. 3	Bushels. 22
Tieton unit.....	Bushels. 18	Bushels. 16	Bushels. 25	Bushels. 15	Bushels. 15	Bushels. 21	Bushels. 1.4	Bushels. .8	Bushels. .8	Bushels. .8	Bushels. 15	Tons. 2.3	Tons. 1.3	Tons. .9	Tons. 2.2	Bushels. 1
Wyoming: Shoshone.....	Bushels. 18	Bushels. 16	Bushels. 25	Bushels. 15	Bushels. 15	Bushels. 21	Bushels. 1.4	Bushels. .8	Bushels. .8	Bushels. .8	Bushels. 15	Tons. 2.3	Tons. 1.3	Tons. .9	Tons. 2.2	Bushels. 1
Average.....	Bushels. 26	Bushels. 26	Bushels. 29	Bushels. 10	Bushels. 19	Bushels. 25	Bushels. 3.1	Bushels. 1.9	Bushels. 26	Bushels. 10	Bushels. 13	Tons. 3.1	Tons. 1.9	Tons. 1.4	Tons. 2.2	Bushels. 16

State and project.	Vegetables.				Fruit and nuts.								Miscellaneous.			
	Beans.	Onions.	Pota- toes, white.	Pota- toes, sweet.	Apples.	Citrus fruit.	Peach- es.	Pears.	Prunes.	Small fruit.	All.	Beet sugar.	Cotton.	Hops.	Cane.	
Arizona: Salt River	Bushels.	Bushels.	Bushels.	Bushels.	Pounds.	Pounds.	Pounds.	Pounds.	Pounds.	Pounds.	Pounds.	Tons.	Pounds.	Pounds.	Tons.	
Arizona-California: Yuma.	16		30		3,500	3,500				3,100	3,600	3,600	341		12	
California: Orland.	16										4,000		373			
Colorado: Uncompahgre Valley.											3,800					
Idaho:	14	246	148		10,268	8,820	3,572	1,439	1,150	2,323	9,100	14				
Boise.	3	25	118	31	1,671		577		2,800	744	1,300	3.3				
Minnesota— Gravity unit.	16	38	180		1,210			34	798	617	1,100	12				
South side pumping unit.	13	24	115		1,888					3,446	2,200	10				
Montana:																
Huntley.	13		89									10				
Milk River.	188		135		810							14				
Sun River.	32															
Montana-North Dakota: Lower Yellow-																
stone.																
Nevada: Truckee-Carson.																
New Mexico:																
Carlsbad.				200			351				351	7	276		3	
Hondo.		228			1,985						1,900				2.2	
New Mexico-Texas: Rio Grande.					9,615					2,630	8,600					
North Dakota: North Dakota pumping.	6															
Oregon: Umatilla.		300	193		560		441	302		1,290	660					
Oregon-California: Klamath.		179	91													
South Dakota: Belle Fourche.																
Washington:	7		101									8				
Okanogan.																
Yakima—	13	70	110		1,285		3,085	1,745	3,350	2,350	1,400					
Sunnyside unit.					8,347		7,405	11,327	16,440		8,500			2,008		
Tieton unit.	19	96	120		4,400		7,200	2,700		2,050	4,700			1,400		
Wyoming: Shoshone.	1	35	132		7,700					88	250	9				
Average.	10	200	150	73	7,200	4,100	5,900	9,400	13,900	3,300	6,400	9.6	340	1,870	10	

1 Data are for calendar year (irrigation season); except for Salt River project, Arizona, data are for corresponding agricultural year, October, 1913, to September, 1914.

2 Includes old alfalfa, 5.6; new, 1.3.

3 Includes old alfalfa, 3.3; new, 0.3.

4 Includes old alfalfa, 500; other small fruits, 3,500.

5 Includes olives, 500; other small fruits, 3,500.

6 Includes deciduous fruit, 4,000, not reported in detail.

7 Long staple, 350; short staple, 300.

8 Includes deciduous fruit, 2,455, not reported in detail, and almonds, 721.

9 Includes miscellaneous fruit, 500.

10 Includes apricots, 2,535.

*Estimated total yields of irrigated crops on reclamation projects in 1914.*

State and project.	Cereals.						Other grain and seed.					Hay and forage.				
	Barley.	Corn, Indian.	Oats.	Rye.	Wheat.	Total.	Alfalfa seed.	Clover seed.	Corn, sorghum.	Millet seed.	Total.	Alfalfa hay.	Clover hay.	Other hay.	Corn fodder.	Field peas.
	Bushels.	Bushels.	Bushels.	Bushels.	Bushels.	Bushels.	Bushels.	Bushels.	Bushels.	Bushels.	Bushels.	Tons.	Tons.	Tons.	Tons.	Bushels.
Arizona: Salt River.....	426,644	46,295	67,550		194,880	735,371	20,772		316,275		316,275	260,198		1,556	393	
Arizona-California: Yuma.....	48,964	8,595			12,710	70,269			100,153		120,925	32,525		1,067		
California: Orland.....									5,794		5,794	28,539				
Colorado: Uncompaghe Valley.....	3,695	13,309	222,244	410	142,152	381,810	27	2			29	34,638	162	618	567	541
Idaho:																
Boise—																
Farms reported.....	43,161	126,509	124,833	1,321	205,925	501,749	396	12,213		652	±15,061	64,753	9,798	382	2,331	329
Farms not reported.....	12,500	36,700	36,200	383	59,600	145,383	116	3,540		189	±4,366	18,780	2,840	111	676	95
Minnesota—																
Gravity unit.....	19,906	9,226	133,057	2,540	87,334	252,063	5	28			33	63,982	3,006	410	146	2,289
South side pumping unit.....	20,564	185	94,625	60	128,128	243,562	10	320			330	38,749	436	18	82	14,706
Montana:																
Huntley.....	6,689	11,755	96,014	28	39,127	153,613	419				419	17,440	59	430	85	470
Milk River.....	645		13,947		9,158	22,750	5				±235	504				165
Sun River.....	9,407	85	63,312	264	11,343	84,411	24			97	121	5,471		303		
Montana-North Dakota: Lower Yellowstone.....	8,072	3,512	17,628		20,998	50,210					81,964	6,482		90		
Nebraska-Wyoming: North Platte.....	53,022	93,186	146,211	1,363	9,979	303,761	863			63	926	71,405		255		
Nevada: Truckee-Carson.....	31,064		18,000		29,164	78,248						61,002		1,504		
New Mexico:																
Carlsbad.....	125	12,410			30	12,565	309		13,850		14,159	19,420		31	222	
Hondo.....		495				495			7,630		7,630	1,492		18	304	
New Mexico-Texas: Rio Grande.....	1,965	68,809	29,843		49,750	160,367						66,028				
North Dakota: North Dakota pumping.....	441	712	665		456	2,274					±50	2,213		47		
Oregon: Umatilla.....		1,800		42	280	2,132		1			1	7,511	16	108	244	
Oregon-California: Klamath.....	143,347		77,031	1,295	27,281	248,654						22,235		3,589		
South Dakota: Belle Fourche.....	34,718	106,280	209,813	244	108,880	469,685	3,305	14		889	4,208	20,473	47	1,911	1,159	
Washington:																
Okanogan.....		1,760				1,760						3,754	24	180	85	
Yakima.....																
Sunnyside unit.....	321,281				18,000	339,281						130,820	2,406	4,041		
Tieton unit.....	14,000	45,000	30,450		23,500	112,950	96	180				18,580	1,180	1,470	1,130	
Wyoming: Shoshone.....	16,921	45	93,644		20,315	140,926	118	17			15	160	29	82	5	
Total.....	385,870	907,939	1,475,067	7,960	1,209,010	4,495,836	26,466	16,315	443,702	1,905	463,942	1,027,002	19,997	18,191	7,419	19,595

<sup>1</sup> Data are for calendar year (irrigation season); except on Salt River project, Arizona, data are for corresponding agricultural year October, 1913, to September, 1914.

<sup>2</sup> A profits on Olanogon project, 190,000 pounds.

<sup>3</sup> Almonds, Orland project, 6,500 pounds.

<sup>4</sup> Brown corn on Boise project, 57 tons.

<sup>5</sup> Cane and corn fodder on Yuma project, 993 tons.

<sup>6</sup> Cane on Salt River project, 10,813 tons; Carlsbad project, 837 tons; Hondo project, 80 tons.

<sup>7</sup> Citrus fruit on Salt River project, 2,472,750 pounds, and Orland project, 766,500 pounds.

<sup>8</sup> Cotton seed on Yuma project, 728 tons.

<sup>9</sup> Flaxseed on Milk River project, 230 bushels; Lower Yellowstone project, 1,954 bushels; North Dakota pumping project, 50 bushels.

<sup>10</sup> Hops on Yakima project, Sunnyside unit, 487,450 pounds; Tieton unit, 397,400 pounds.

<sup>11</sup> Mangels or stock beets on Minidoka project, gravity unit, 155 tons; pumping unit, 78 tons; Sun River, 13 tons; North Platte, 3,334 tons.

<sup>12</sup> Popcorn on Boise project: Farms reported, 1,800 pounds; farms not reported, 522 pounds.

<sup>13</sup> Sweet potatoes on Boise project: Farms reported, 281 bushels; farms not reported, 84 bushels; Carlsbad project, 800 bushels.

<sup>14</sup> Including pop corn.

<sup>15</sup> Assumed at same yield per acre as farms reported.

<sup>16</sup> Includes 280 bushels flaxseed.

<sup>17</sup> Flaxseed.



## Estimated total yields of irrigated crops on reclamation projects in 1914—Continued.

State and project.	Vegetables.			Fruits and nuts.						Miscellaneous.	
	Beans.	Onions.	Potatoes, white.	Apples.	Peaches.	Pears.	Prunes.	Small fruit.	Total.	Beets, sugar.	Cotton.
Arizona: Salt River.....	Bushels.	Bushels.	Bushels.	Pounds.	Pounds.	Pounds.	Pounds.	Pounds.	Pounds.	Tons.	Pounds.
Arizona-California: Yuma.....	9,080	.....	6,967	.....	.....	.....	.....	3,309,500	110,766,890	.....	3,927,837
California: Orland.....	2,028	.....	.....	.....	.....	.....	.....	163,000	163,000	.....	845,044
Colorado: Uncompahgre Valley.....	1,502	57,561	675,210	17,044,950	584,350	46,040	25,300	30,000	11,077,500	.....	.....
Idaho:	.....	.....	.....	.....	.....	.....	.....	204,425	17,885,053	11,876	.....
Boise—	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Farms reported.....	1,380	207	130,752	352,517	24,150	.....	23,895	77,148	477,710	24	.....
Farms not reported.....	400	60	37,900	102,200	7,000	.....	6,980	22,400	138,530	7	.....
Minnesota—	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Gravity unit.....	81	563	330,933	387,208	.....	336	1,595	25,908	415,047	6,979	.....
South side pumping unit.....	121	316	263,461	18,880	.....	.....	.....	10,337	20,217	17,979	.....
Montana:	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Huntley.....	511	.....	10,680	.....	.....	.....	.....	.....	.....	41,030	.....
Milk River.....	.....	.....	2,633	.....	.....	.....	.....	.....	.....	.....	.....
Sun River.....	24	.....	15,480	450	.....	.....	.....	1,000	1,450	21	.....
Montana-North Dakota: Lower Yellowstone.....	.....	.....	7,580	.....	.....	.....	.....	.....	.....	.....	.....
Nebraska-Wyoming: North Platte.....	.....	.....	180,027	.....	.....	.....	.....	.....	.....	53,262	.....
Nevada: Truckee-Carson.....	7,000	.....	23,800	.....	.....	.....	.....	.....	.....	.....	.....
New Mexico:	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Carlsbad.....	.....	456	.....	.....	20,000	.....	.....	.....	.....	.....	.....
Hondo.....	.....	.....	.....	112,000	.....	.....	.....	.....	20,000	35	369,459
New Mexico-Texas: Rio Grande.....	1,960	.....	.....	4,297,968	.....	.....	.....	.....	115,500	.....	.....
North Dakota: North Dakota pumping.....	.....	.....	.....	.....	.....	.....	.....	200,000	4,497,968	.....	.....
Oregon: Umatilla.....	.....	300	6,912	.....	.....	.....	.....	.....	.....	.....	.....
Oregon-California: Klamath.....	.....	628	5,618	29,682	52,000	2,262	.....	83,610	167,554	.....	.....
South Dakota: Belle Fourche.....	314	.....	28,057	.....	.....	.....	.....	.....	.....	247	.....
Washington:	.....	.....	19,796	.....	.....	.....	.....	.....	.....	.....	.....
Yanogan.....	260	210	10,500	1,868,415	540,360	61,115	13,400	62,100	2,575,420	.....	.....
Yacoma—	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Sunnyside unit.....	.....	.....	882,400	59,834,030	8,627,260	9,707,700	3,091,040	3,000,000	84,260,070	.....	.....
Fleeta unit.....	1,430	6,700	400,400	2,730,000	1,553,000	381,800	.....	65,600	4,730,400	.....	.....
Wyoming: Shoshone.....	4	33	11,537	330	.....	.....	.....	140	.....	1,041	.....
Total.....	19,092	74,636	3,029,643	86,808,670	11,368,170	10,199,253	3,102,160	7,092,168	127,321,811	121,831	5,132,340

<sup>1</sup> Includes 4,984,640 pounds deciduous fruit not reported in detail and 2,472,750 pounds citrus fruit.

<sup>2</sup> Includes 216,000 pounds deciduous fruit not reported in detail, 766,500 pounds citrus fruit, and 6,500 pounds almonds.

<sup>3</sup> Assumed at same yield per acre as farms reported.

<sup>4</sup> Includes 3,500 pounds miscellaneous fruit not reported in detail.

Average values per acre of irrigated crops harvested on reclamation projects in 1914.<sup>1</sup>

State and project.	Cereals.					Other grain and seed.				Hay and forage.							
	Barley.	Corn, Indian.	Oats.	Rye.	Wheat.	All.	Alfalfa seed.	Clover seed.	Corr, sorghum.	All.	Alfalfa hay.	Clover hay.	Other hay.	Corn fodder.	Pas- ture.	Peas.	All.
Arizona, Salt River.....	\$16.00	\$17.00	\$10.00		\$22	\$18			\$12.50	\$12.50	\$18		\$8.00	\$12.50	\$12.00		\$16.70
Arizona-California, Yuma.....	17.00	21.00			22	18	\$29.00		23	27.00	19		12.00		12.00		16.00
California, Orland.....									33	33.01	21				43.08		13.00
Colorado, Uncompaghe Valley.....	13.00	30.00	15.00	\$16.00	24	19	11.00	\$7.67		10.00	17	\$5.22	10.00	12.00	5.59	\$2.77	16.00
Idaho:																	
Boise.....	12.00	13.00	11.00	6.79	17	14	12.00	15.00		15.00	20	11.00	5.72	23.00	9.09	15.00	16.00
Minidoko.....																	
Gravity unit.....	13.00	15.00	12.00	11.00	13	13	6.00	7.71		7.47	17	16.00	11.00	19.00	6.16	20.00	15.00
South side pumping.....			10.00	6.30	12	11	12.00	40.00		38.00	16	17.00	13.00	13.00	7.44	15.00	14.00
Montana:																	
Huntley.....	10.00	15.00	10.00	1.87	23	14	43.00			43.00	14	20.00	15.00	9.12		6.37	14.00
Milk River.....	3.17		24.00		14	16	15.00			5.62	21		2.34		10.00		13.00
Sun River.....	18.00	68.00	15.00	14.00	20	16	25.00			25.00	14		8.51		4.87	30.00	12.00
Montana-North Dakota, Lower Yellowstone.....																	
Lowstone.....	8.48	24.00	11.00		20	15				15.00	16		9.18		4.43		16.00
Nebraska-Wyoming, North Platte.....	14.00	12.00	8.33	3.89	14	11	7.49			7.22	10		5.62		8.00		10.00
Nevada, Truckee-Carson.....	14.00		17.00		27	20					14		2.88		1.21		7.84
New Mexico:																	
Carlsbad.....	11.00	25.00			19	25	6.12		25	19.00	23		6.22		8.57		21.00
Hondo.....	18.00					18					18		30.00	6.00	10.00		15.00
New Mexico-Texas, Rio Grande.....	23.00	15.00	24.00		27	19			17	17.00	37			14.00	12.00		15.00
North Dakota, N. Dak. pumping.....	11.00	28.00	15.00		18	17				13.00	31		12.00		36.00		30.00
Oregon, Umatilla.....		30.00		17.00	38	30		21.00		21.00	29	23.00	6.52	10.00	13.00		25.00
Oregon-California, Klamath.....	16.00		14.00	7.08	17	15					17		11.00		8.00		12.00
South Dakota, Belle Fourche.....	17.00	17.00	13.00	16.00	12	14	17.00	11.00		16.00	9	4.52	8.55	6.61	3.35		7.83
Washington:																	
Okanogan.....		15.00				15					29	24.00	7.50	11.00	15.00		24.00
Yakima.....																	
Sunnyside unit.....	25.00	22.00	16.00		30	37					36	25.00	25.00		20.00		34.00
Tieton unit.....					21	21	120.00	30.00		41.00	21	17.00	15.00	16.00	18.00		19.00
Wyoming, Shoshone.....	15.00	8.18	12.00		13	13	17.00	9.00		15.00	15	8.79	5.67	11.00	12.00	2.67	15.00
Average all projects.....	15.00	19.00	12.00	7.26	18	16	23.00	15.00	15	17.00	19	13.00	11.00	13.40	7.60	14.00	16.50

<sup>1</sup> Data are for calendar year (irrigation season), except for Salt River project, Arizona, data are for corresponding agricultural year, October, 1913, to September, 1914.<sup>2</sup> Includes flaxseed Milk River, \$5.10; Lower Yellowstone, \$16; North Dakota pumping, \$13; average, \$13. Millet seed: Boise, \$35; Sun River, \$24; North Platte, \$1.47; Belle Fourche, \$16; Shoshone, \$8; average, \$16.<sup>3</sup> Includes mangels or stock beets: Minidoka, Gravity unit, \$60; pumping unit, \$34; Sun River, \$24; North Platte, \$62. Cane and corn fodder, Yuma, \$13.<sup>4</sup> Major part of area also cut for hay.

Average values per acre of irrigated crops harvested on reclamation projects in 1914—Continued.

State and project.	Vegetables and truck.				Fruit and nuts.						Miscellaneous.		All crops.	
	Beans.	Onions.	Pota- toes, white.	Truck.	All. <sup>1</sup>	Apples.	Peaches.	Pears.	Prunes.	Small fruit.	All. <sup>2</sup>	Beets, sugar.		Cane.
Arizona, Salt River.....	\$39.00	.....	\$29	\$83	\$75	.....	.....	.....	.....	\$124	\$118	.....	\$48	\$28.80
Arizona-California, Yuma.....	35.00	.....	59	59	52	.....	.....	.....	.....	102	102	.....	.....	31.43
California, Orland.....	.....	.....	92	92	92	.....	.....	.....	.....	135	\$108	.....	.....	26.99
Colorado, Uncompahgre Valley.....	35.00	\$75	46	55	47	\$64.00	\$37.00	\$37.00	\$27	96	62	\$65	.....	26.30
Idaho:														
Boise.....	9.38	20	57	36	41	11.00	4.33	.....	42	37	18	17	25	17.80
Mindoko—														
Gravity unit.....	29.00	38	54	49	53	18.00	.....	1.30	51	49	21	59	.....	16.91
South side pumping.....	24.00	24	34	30	33	28.00	.....	.....	.....	276	85	47	.....	16.65
Montana:														
Huntley.....	39.00	.....	55	80	70	.....	.....	.....	.....	.....	.....	58	.....	26.63
Milk River.....	.....	188	200	189	189	.....	.....	.....	.....	.....	.....	.....	.....	16.00
Sun River.....	85.00	.....	81	99	88	26.00	.....	.....	.....	67	51	78	.....	16.25
Montana-North Dakota, Lower Yellowstone.....	.....	.....	91	79	84	.....	.....	.....	.....	.....	.....	.....	.....	17.20
Nebraska-Wyoming, North Platte.....	.....	.....	51	17	43	.....	.....	.....	.....	.....	.....	58	.....	14.96
Nevada, Truckee-Carson.....	228	.....	40	41	45	.....	.....	.....	.....	.....	.....	.....	.....	\$11.23
New Mexico:														
Carlsbad.....	.....	281	.....	51	80	11.00	14.00	.....	.....	.....	14	35	24	22.15
Hondo.....	.....	.....	.....	113	99	241.00	.....	.....	.....	79	12	17	.....	18.31
New Mexico-Texas, Rio Grande.....	11.00	.....	.....	116	133	.....	.....	.....	.....	.....	217	.....	.....	42.51
North Dakota, North Dakota pumping.....	.....	300	.....	157	101	.....	.....	.....	.....	.....	.....	.....	.....	34.87
Oregon, Umatilla.....	157	.....	81	119	101	9.28	6.62	12.00	.....	65	23	.....	.....	26.41
Oregon-California, Klamath.....	.....	.....	49	67	53	.....	.....	.....	.....	.....	78	.....	.....	14.22
South Dakota, Belle Fourche.....	22.00	.....	81	51	63	.....	.....	.....	.....	.....	.....	27	.....	12.56
Washington:														
Okanogan.....	45.00	95	66	76	69	27.00	31.00	35.00	33	94	728	.....	.....	22.88
Yakima—														
Sunnyside unit.....	.....	.....	83	112	87	100.00	104.00	170.00	435	108	113	.....	.....	58.02
Tieton unit.....	45.00	29	36	50	37	88.00	36.00	37.00	.....	100	68	.....	.....	26.60
Wyoming, Shoshone.....	3.12	59	66	57	60	28.00	.....	.....	.....	23	25	58	.....	15.01
Average all projects.....	23.00	82	53	76	59	86.00	73.00	148.00	36	108	96	57	42	23.50

<sup>1</sup> Includes sweet potatoes: Boise, \$77; Carlsbad, \$200.<sup>2</sup> Includes citrus fruit: Salt River, \$140; Orland, \$150.<sup>3</sup> Includes olives, \$15; other small fruit, \$140.<sup>4</sup> Deciduous fruit, \$100; citrus, \$140.<sup>5</sup> Includes deciduous fruit, \$17; citrus, \$150.<sup>6</sup> \$18.22, excluding 19,000 native acres pasture, at \$1.21 per acre, and 4,908 acres otherwise not in full production.<sup>7</sup> Includes apricots, \$32.

Average prices of irrigated crops on reclamation projects in 1914.<sup>1</sup>

State and project.	Cereals.						Other grain and seed.					Hay and forage.				
	Barley.	Corn, Indian.	Oats.	Rye.	Wheat.	All.	Alfalfa seed.	Clover seed.	Corn, sorghum.	Flax seed.	Millet seed.	Alfalfa hay.	Clover hay.	Other hay.	Corn fodder.	Field peas.
Arizona: Salt River.	Bush. \$0.65	Bush. \$0.85	Bush. \$0.55	Bush.	Bush. \$1.10	Bush. \$0.77	Bush. \$7.80	Bush.	Bush. \$0.50	Bush.	Bush.	Ton. \$6.00	Ton.	Ton. \$8.00	Ton. \$20.00	Bush.
Arizona-California: Yuma.	.58	.65			1.00	.67			.70			6.05	7.64			
California: Orland.									.83			4.20	6.75			
Colorado: Uncompahgre Valley.	.56	.91	.42	\$0.99	.88	.61	8.00	\$11.50				5.99	6.75		3.79	\$0.96
Idaho:																
Boise.	.55	.70	.45	.65	.90	.71	7.50	7.50			\$1.50	5.50	7.00	5.00	7.00	1.80
Minidoka—																
Gravity unit.	.43	.70	.38	.63	.70	.51	6.00	8.40				5.00	5.00	5.15	5.00	.90
South side pumping unit.	.43	.70	.38	.63	.70	.55	6.00	8.40				5.00	5.00	5.00	5.00	.90
Montana:																
Huntley.	.53	.62	.32	.60	.98	.46	7.00					5.00	12.00	11.50	6.00	.75
Milk River.	.55	.79	.70	.95	.95	.79	9.00			\$1.22		11.00		12.00		
Sun River.	.70	.80	.50	.74	.90	.58	10.63				1.00	6.50		8.60		1.00
Montana-North Dakota: Lower Yellow-																
stone.	.43	.72	.34		1.00	.66				1.24		7.20		9.18		
Nebraska-Wyoming: North Platte.	.60	.75	.40	.70	.85	.58	8.00				1.00	4.50		8.00		
Nevada: Truckee-Carson.	.60		.40		1.35	.83						5.00		3.00		
New Mexico:																
Carlsbad.	.46	1.00			1.27	1.00	5.36		1.00			8.55		9.84	6.29	
Hondo.	.75	.75	.54		.75	.75						8.26		10.00	7.00	
New Mexico-Texas: Rio Grande.	.71	.83	.54		.90	.77			.74			10.34		10.00	7.00	
North Dakota: North Dakota pumping.	.41	.50	.35	.85	1.00	.54				1.25		12.00		5.60		
Oregon: Umatilla.	.85			1.20	.98	.88	14.00					8.00	8.00	6.67	3.40	
Oregon-California: Klamath.	.45		.40	.75	.90	.49						7.00		7.30		
South Dakota: Belle Fourche.	.70		.40	.90	.90	.61	7.30				1.00	4.50	5.00	10.00		
Washington:																
Okanogan.		.60				.60						8.50	10.00	10.00	7.00	
Yakima.																
Sunnyside unit.	.71					.71						7.25	8.50	8.41		
Tieton unit.	.90	.75	.40		1.00	.73	10.00	10.00				6.00	6.00	8.50	2.00	
Wyoming: Shoshone.	.85	.50	.50		.85	.62	12.00	12.00			.40	6.50	6.50	6.50	5.00	3.00
Average.	.60	.74	.42	.70	.94	.65	7.60	7.60	.57	1.24	1.22	6.18	6.80	7.82	6.20	.88

<sup>1</sup> Data are for calendar year (irrigation season), except on Salt River project, Ariz., data are for corresponding agricultural year October, 1913, to September, 1914. The effort has been to secure the value received by the farmer for his crops, whether sold on the farm or in town, with or without baling, boxing, etc. If by the farmer, the crop is given a value representing the selling price on the farm.

*Average prices of irrigated crops on reclamation projects in 1914—Continued.*

State and project.	Vegetables and truck.				Fruit and nuts.							Miscellaneous.			
	Beans.	Onions.	Potatoes, white.	Potatoes, sweet.	Apples.	Citrus fruit.	Peaches.	Pears.	Prunes.	Small fruit.	All.	Beets, sugar.	Cotton.	Hops.	Cane.
Arizona: Salt River.	Bush.	Bush.	Bush.	Bush.	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.	Ton.	Lb.	Lb.	Ton.
Arizona-California: Yuma.	\$2.40		\$0.95			\$0.04				1	\$0.033		\$0.17		\$4.00
California: Orland.	2.24					.017					.025		.08		
Colorado: Uncompahgre Valley.	2.46	\$0.30	.31		\$0.006		\$0.01	\$0.026	\$0.023	.04	.007	\$4.74			
Idaho:															
Boise.	3.00	.80	.48	\$2.50	.007		.007		.015	.05	.014	5.00			
Minidoka—															
Gravity unit.	1.80	1.00	.30		.015			.04	.064	.08	.019	4.75			
South side pumping unit.	1.80	1.00	.30		.015					.08	.038	4.75			
Montana:															
Huntley.	3.00		.62									6.00			
Milk River.			1.00		.03					.05	.043	5.47			
Sun River.	2.57		.60												
Montana-North Dakota: Lower Yellowstone.			.65												
Nebraska-Wyoming: North Platte.			.35									5.50			
Nevada: Truckee-Carson.		.60	.48												
New Mexico:															
Carlsbad.		1.23		1.00			.04				.04	5.00	.075		7.46
Hondo.					.006						.007				7.75
New Mexico-Texas: Rio Grande.	1.80				.025						.025				
North Dakota: North Dakota pumping.		1.00	.60												
Oregon: Umatilla.		.87	.89		.017		.015	.04		.05	.033				
Oregon-California: Klamath.			.80												
South Dakota: Belle Fourche.	3.00		.80									4.00			
Washington:															
Okanogan.	3.50	1.35	.60		.02		.01	.02	.01	.04	.019				
Yakima—															
Sunnyside unit.			.36		.012		.014	.015	.026		.013			\$0.10	
Tieton unit.	2.40	.30	.02		.02		.005	.01		.05	.015			.09	
Wyoming: Shoshone.	3.00	1.70	.50		.04					.25	.10	5.65			
Average.	2.23	.41	.35	1.48	.012	.035	.012	.014	.026	.04	.015	5.90	.16	.10	4.25

1 Includes olives, \$0.02.

2 Includes deciduous fruit, \$0.025, not reported in detail.

3 Includes long staple, \$0.50, and short staple, \$0.08.

4 Includes deciduous fruit, \$0.019, not reported in detail, and almonds, \$0.168.

5 Includes miscellaneous fruit, \$0.04, not reported in detail.





*Inventory of live stock and equipment on reclamation project farms at close of 1914.<sup>1</sup>*

State and project.	Horses.			Mules.			Cattle.		
	Num-ber.	Value.		Num-ber.	Value.		Num-ber.	Value.	
		Each.	Total.		Each.	Total.		Each.	Total.
Arizona: Salt River.....	12,184	\$96	\$1,175,175	1,106	\$142	\$157,095	\$40,451	\$56	\$2,262,086
Arizona-California: Yuma.....	2,465	99	245,227	544	138	75,272	\$4,894	56	273,769
California: Orland.....	4,798	99	78,665	.....	.....	.....	\$2,904	59	172,164
Colorado: Uncompahgre Valley	3,405	93	315,797	164	119	19,460	5,719	39	223,638
Idaho:									
Boise—									
Farms reported.....	5,118	84	428,835	247	93	23,003	\$5,901	51	298,817
Farms not reported <sup>2</sup> .....	1,480	84	124,500	72	93	6,700	1,712	51	86,700
Minidoka—									
Gravity unit.....	3,850	105	405,660	160	109	17,415	4,394	49	215,363
South side pumping unit.....	2,063	102	209,914	44	104	4,575	2,150	53	113,520
Montana:									
Huntley.....	2,008	109	218,640	53	135	7,150	\$2,921	47	138,625
Milk River.....	688	96	66,150	2	100	200	454	56	25,575
Sun River.....	637	116	62,330	14	115	2,035	786	57	44,760
Montana-North Dakota:									
Lower Yellowstone.....	1,298	132	171,330	30	93	2,800	\$1,574	54	84,483
Nebraska-Wyoming: North									
Platte <sup>10</sup> .....	4,618	80	369,440	.....	.....	.....	3,190	45	143,550
Nevada: Truckee-Carson.....	3,079	87	267,575	404	86	34,905	11,604	51	306,949
New Mexico:									
Carlsbad.....	679	91	62,105	109	128	13,915	672	50	33,430
Hondo.....	228	45	10,190	28	77	2,150	390	35	13,510
New Mexico-Texas: Rio									
Grande.....	1,828	82	150,465	215	101	21,800	1,740	51	88,702
North Dakota: North Dakota									
pumping.....	86	113	9,750	.....	.....	.....	118	48	5,620
Oregon: Umatilla <sup>11</sup> .....	633	87	55,305	26	126	3,345	13,847	59	49,690
Oregon-California: Klamath.....	2,356	91	214,970	90	84	7,580	4,660	40	188,350
South Dakota: Belle Fourche..	2,848	87	249,150	59	112	6,635	14,092	51	208,067
Washington:									
Okanogan.....	587	100	58,700	16	125	2,000	459	30	36,720
Yakima—									
Sunnyside unit.....	6,641	86	570,665	109	107	11,665	8,967	62	554,449
Tieton unit.....	1,340	94	125,900	17	105	1,785	1,425	62	88,400
Wyoming: Shoshone.....	1,412	117	165,185	63	117	7,390	2,163	54	116,292
Total and average.....	62,247	93	5,811,653	3,572	120	428,875	108,626	53	5,775,219

<sup>1</sup> Taken at close of irrigation season; for Salt River project, Ariz., at end of agricultural year, Sept. 30. Reports cover only irrigated farms.

<sup>2</sup> 19,508 dairy cattle, \$1,141,971, and 20,943 beef cattle, \$1,120,115.

<sup>3</sup> 2,043 dairy cattle, \$166,335, and 2,851 beef cattle, \$107,434.

<sup>4</sup> Horses and mules.

<sup>5</sup> 2,549 dairy cattle, \$159,404, and 355 beef cattle, \$12,760.

<sup>6</sup> 5,150 dairy cattle, \$273,827, and 751 beef cattle, \$24,990.

<sup>7</sup> Figures assumed in same proportion to those for reported farms as known irrigated areas.

<sup>8</sup> 789 milch cows, \$52,080, and 133 calves, \$3,995.

<sup>9</sup> 784 dairy cattle, \$44,865, and 330 beef cattle, \$39,618.

<sup>10</sup> Figures are exclusive of stock brought to the project for wintering or fattening, numbering about 75,000 sheep, 4,700 cattle, and 500 horses.

<sup>11</sup> 1,503 dairy cattle, \$127,190, and 4,540 other cattle, \$181,759.

<sup>12</sup> Reduced total stock value represents reduction in number of sheep brought to project for wintering. About 400 hogs were lost by cholera during the year.

<sup>13</sup> 641 dairy cattle, 206 beef cattle.

<sup>14</sup> 1,573 dairy cattle, \$58 each, and 2,514 beef cattle, \$47 each.



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*Inventory of live stock and equipment on reclamation project farms at close of 1914—Con.*

State and project.	Sheep.			Hogs.			Fowls.		
	Num- ber.	Value.		Num- ber.	Value.		Num- ber.	Value.	
		Each.	Total.		Each.	Total.		Each.	Total.
Arizona: Salt River.....	6,419	\$4.01	\$25,721	18,807	\$5.86	\$110,365	169,240	\$0.50	\$84,620
Arizona-California: Yuma.....	1,384	4.65	6,432	4,982	7.60	37,848	35,935	.79	28,342
California: Orland.....	565	4.98	2,815	2,400	9.14	21,938	11,223	.55	6,238
Colorado: Uncompahgre Valley	14,710	3.69	54,227	4,941	8.47	41,848	39,226	.50	19,501
Idaho:									
Boise—									
Farms reported.....	5,738	4.38	25,126	25,066	6.39	160,328	81,406	.53	43,249
Farms not reported <sup>1</sup> ..	1,665	4.38	7,300	7,280	6.39	46,500	23,620	.53	12,600
Minnesota—									
Gravity unit.....	11,008	5.85	64,950	14,128	7.52	106,273	50,842	.44	22,328
South side pumping									
unit.....	2,490	3.70	9,234	15,691	7.46	117,075	25,534	.43	10,853
Montana:									
Huntley.....	847	3.22	2,730	4,612	9.68	44,536	23,345	.49	11,356
Milk River.....				1,008	10.54	10,599	2,246	.72	1,615
Sun River.....	34	9.41	320	3,215	8.61	27,675	11,105	.55	6,062
Montana-North Dakota:									
Lower Yellowstone.....	2,152	3.60	7,754	3,333	6.84	22,786	13,118	.55	7,181
Nebraska-Wyoming: North									
Platte <sup>2</sup> .....	605	3.00	1,815	22,143	8.00	177,144	43,896	.40	17,559
Nevada: Truckee-Carson.....	1,981	5.20	10,214	3,815	8.65	32,999	34,371	.96	32,747
New Mexico:									
Carlsbad.....				625	8.79	5,493	6,237	.62	3,896
Hondo.....				200	8.60	1,720	892	.61	546
New Mexico-Texas: Rio									
Grande.....	4,108	4.27	440	4,189	7.66	32,091	34,147	.86	29,080
North Dakota: North Dakota									
pumping.....	56	5.00	280	309	9.21	2,850	1,510	.49	750
Oregon: Unstilla <sup>3</sup> .....	42	5.38	226	2,185	8.37	18,294	12,189	.63	7,735
Oregon-California: Klamath...	361	4.63	1,673	6,542	11.45	74,851	16,917	.46	7,793
South Dakota: Belle Fourche..	25,740	3.76	96,782	11,988	8.97	107,772	29,186	.49	14,252
Washington:									
Okanogan.....				540	9.00	4,860	7,410	.45	3,335
Yakima—									
Sunnyside unit.....	1,958	4.55	9,104	23,948	8.21	196,629	113,099	.57	64,500
Tieton unit.....	71	3.90	276	4,990	7.20	35,850	20,330	.57	11,480
Wyoming: Shoshone.....	1,161	3.66	4,214	4,679	7.71	36,064	23,888	.44	10,448
Total and average.....	79,140	4.19	331,632	191,640	7.69	1,474,238	830,946	.55	458,056

<sup>1</sup> Figures assumed in same proportion to those for reported farms as known irrigated areas.

<sup>2</sup> Figures are exclusive of stock brought to the project for wintering or fattening, numbering about 75,000 sheep, 4,700 cattle, and 500 horses.

<sup>3</sup> 6,972 turkeys, \$15,968, or \$2.30 each, and 27,399 other fowl, \$16,759, or \$0.60 each.

<sup>4</sup> Includes goats.

<sup>5</sup> Reduced total stock value represents reduction in number of sheep brought to project for wintering. About 400 hogs were lost by cholera during the year.

*Inventory of live stock and equipment on reclamation project farms at close of 1914—Con.*

State and project.	Bees (hives).			Total stock value.	Value of equip- ment.	Total stock and equip- ment.	Increase in value over 1913.		
	Num- ber.	Value.					Stock.	Equip- ment.	Total.
		Each.	Total.						
Arizona: Salt River.....	10,430	\$5.00	\$52,150	\$4,408,882	\$640,377	\$5,047,039	\$483,705	\$176,997	\$660,702
Arizona-California: Yuma.	4,066	4.80	19,499	1,687,464	150,863	1,838,327	77,772	5,342	83,114
California: Orland.....	243	4.87	1,185	283,005	59,682	342,687	80,664	5,052	85,716
Colorado: Uncompahgre Valley.....	2,558	4.77	12,188	686,659	180,535	867,194	81,006	\$12,570	68,435
Idaho:									
Boise—									
Farms reported....	1,809	3.25	5,885	985,242	339,637	1,324,879	172,066	49,544	221,610
Farms not re- ported <sup>1</sup> .....	524	3.25	1,700	286,000	98,500	384,500	\$286,000	\$98,500	\$384,500
Minkola—									
Gravity unit.....	1,331	5.15	6,850	783,139	202,899	1,042,038	119,987	18,596	138,583
South side pump- ing unit.....	387	6.46	2,499	467,670	160,238	627,908	118,429	25,768	144,197
Montana:									
Huntley.....	247	3.07	758	423,795	97,881	521,676	83,907	\$1,907	\$2,000
Milk River.....				104,109	27,112	131,221	28,482	\$2,678	\$26,804
Sun River.....	8	5.00	40	143,242	31,150	174,392	34,077	7,836	41,913
Montana-North Dakota:									
Lower Yellowstone.....				296,334	103,838	400,172	60,881	19,012	79,893
Nebraska-N. Wyoming:									
North Platte.....	476	3.00	1,428	710,936	275,000	985,936	148,310	25,000	173,310
Nevada: Truckee-Carson..	1,621	4.40	7,104	664,393	151,254	845,647	134,765	\$16,268	118,497
New Mexico:									
Carlsbad.....	1,397	5.00	6,985	125,794	22,540	148,334	19,063	\$4,580	14,478
Hondo.....				28,116	3,825	31,941	1,412	\$50	1,362
New Mexico-Texas: Rio Grande.....	5,723	4.96	28,305	\$362,913	179,802	542,715	59,930	34,569	94,449
North Dakota: North Dakota pumping.....				19,250	5,550	24,800	3,940	280	\$4,320
Oregon: Umatilla <sup>2</sup> .....	464	4.28	1,988	136,563	50,591	187,154	\$20,937	2,466	\$18,471
Oregon-California: Klamath.....	299	5.26	1,566	496,783	130,850	627,633	184,299	57,809	242,108
South Dakota: Belle Fourche.....	129	6.20	801	683,459	132,274	815,733	222,475	14,081	237,556
Washington:									
Okanogan.....	250	5.00	1,250	106,865	47,100	153,965	11,006	\$22,900	\$11,896
Yakima—									
Sunnyside unit....	3,640	3.35	12,182	1,419,194	431,753	1,850,947	72,676	68,312	140,988
Tieton unit.....	408	3.00	1,250	264,941	87,856	352,797	53,158	10,913	64,101
Wyoming: Shoshone.....	952	4.17	3,966	343,549	103,189	446,738	73,663	25,643	99,306
Total and average....	36,962	4.59	169,579	15,002,077	3,714,296	18,716,373	1,625,354	230,713	1,856,067

<sup>1</sup> Includes 4,119 ostriches, valued at \$539,450, or \$130.97 per bird.<sup>2</sup> Includes 98 automobiles, valued at \$120,300, belonging to farmers who live on their farms; automobiles of town farmers not included.<sup>3</sup> Decrease.<sup>4</sup> Includes 193 ostriches, valued at \$1,075, or \$5.57 per bird.<sup>5</sup> Figures assumed in same proportion to those for reported farms as known irrigated areas.<sup>6</sup> These farms not included in figures given in Thirteenth Annual Report for Boise project.<sup>7</sup> Includes 2 elk, valued at \$300 or \$150 each.<sup>8</sup> Figures are exclusive of stock brought to the project for wintering or fattening, numbering about 75,000 sheep, 4,700 head of cattle, and 500 horses.<sup>9</sup> Includes 120 ostriches, valued at \$12,000, or \$100 per bird.<sup>10</sup> Reduced total stock value represents reduction in number of sheep brought to project for wintering. About 400 hogs were lost by cholera during the year.

*Estimated investment and value in irrigated farms on reclamation projects at close of 1914.<sup>1</sup>*

State and project.	Irrigated farms.		Acreage cleared and leveled.
	Number.	Irrigible acreage.	
Arizona: Salt River .....	3,068	194,866	194,866
Arizona-California: Yuma.....	688	25,685	25,685
California: Orland.....	286	8,638	7,280
Colorado: Uncompahgre Valley.....	910	52,338	33,873
Idaho:			
Boise—			
Farms reported.....	1,577	93,011	70,997
Farms not reported <sup>2</sup> .....	331	27,100	20,670
Minidoka.....			
Gravity unit.....	1,151	66,110	45,730
South side pumping unit.....	562	37,800	36,206
Montana:			
Huntley.....	526	23,160	19,974
Milk River.....	26	5,800	.....
Sun River.....	172	8,320	1,480
Montana-North Dakota: Lower Yellowstone.....	154	16,461	12,000
Nebraska-Wyoming: North Platte.....	944	74,216	60,532
Nevada: Truckee-Carson.....	504	52,039	32,780
New Mexico:			
Carlsbad.....	390	15,712	15,000
Hondo.....	25	3,025	.....
New Mexico-Texas: Rio Grande.....	773	30,800	.....
North Dakota: North Dakota pumping.....	44	2,485	.....
Oregon: Umatilla.....	311	9,411	6,912
Oregon-California: Klamath.....	275	24,000	23,000
South Dakota: Belle Fourche.....	615	49,426	36,704
Washington:			
Okanogan.....	448	8,960	7,800
Yakima—			
Sunnyside unit.....	2,450	66,525	66,525
Tieton unit.....	900	22,700	22,700
Wyoming: Shoshone.....	429	25,599	23,701
Total.....	17,619	<sup>3</sup> 954,187	770,421

<sup>1</sup> Close of irrigation season; on Salt River project, Arizona, close of agricultural year, Sept. 30. Figures cover land and improvements only and are exclusive of live stock, equipment, and crops. See preceding tables.

<sup>2</sup> Areas known; other figures estimated by proportion from those for reported farms.

<sup>3</sup> Less than total irrigable acreage of projects, or acreage the service was prepared to supply, as given in other tables, because this table is restricted to farms actually irrigated.

*Estimated investment and value in irrigated farms on reclamation projects at close of 1914—Continued.*

State and project.	Farmers' investment.					Value.
	Purchase price of land.	Clearing and leveling.	Improvements.	Paid construction charges.	Total.	
Arizona: Salt River.....	\$23,392,033	.....	\$6,940,856	.....	\$30,332,889	\$38,112,371
Arizona-California: Yuma.....	2,242,631	\$1,132,417	452,975	\$146,093	3,974,116	3,500,000
California: Orland.....	950,180	243,880	335,415	.....	1,529,475	2,073,965
Colorado: Uncompahgre Valley.....	1,308,450	160,365	991,343	.....	2,460,158	3,848,925
Idaho:						
Boise—						
Farms reported.....	2,244,817	850,753	1,793,045	.....	4,897,615	8,543,577
Farms not reported i..	654,000	260,000	522,500	.....	1,436,500	2,480,000
Minidoka—						
Gravity unit.....	937,360	1,229,974	1,110,640	461,560	3,739,534	4,900,010
South side pumping unit.....	485,395	456,424	560,375	.....	1,502,194	2,679,600
Montana:						
Huntley.....	\$92,640	212,382	426,394	242,747	974,163	1,389,600
Milk River.....	31,500	.....	48,500	.....	80,000	178,000
Sun River.....	( <sup>1</sup> )	8,173	217,880	97,030	323,083	575,650
Montana-North Dakota: Lower Yellowstone.....	230,000	50,000	200,000	34,394	514,394	600,000
Nebraska-Wyoming: North Platte.....	1,000,000	302,660	888,680	217,829	2,409,169	3,339,720
Nevada: Truckee-Carson.....	838,028	1,524,270	565,606	254,102	3,288,846	4,080,875
New Mexico:						
Carlsbad.....	1,200,000	.....	400,000	115,000	1,715,000	2,000,000
Hondo.....	189,000	.....	56,000	.....	245,000	218,000
New Mexico-Texas: Rio Grande.....						
North Dakota: North Dakota pumping.....	2,859,336	.....	707,696	.....	3,567,032	5,032,440
Oregon: Umatilla.....	79,444	.....	104,947	5,903	190,294	199,089
Oregon-California: Klamath.....	543,855	130,778	918,721	182,161	1,775,513	1,528,500
South Dakota: Belle Fourche..	500,000	504,000	300,000	220,000	1,524,000	1,600,000
Washington:	572,188	280,544	709,173	108,009	1,669,914	2,333,376
Okanogan:						
Okanogan.....	1,760,854	156,000	465,000	24,500	2,406,354	3,060,000
Yakima—						
Sunnyside unit.....	4,296,260	1,663,125	8,416,201	616,958	14,992,534	11,641,375
Tieton unit.....	1,500,000	248,000	600,000	150,000	2,498,000	3,600,000
Wyoming: Shoshone.....	9,010	108,193	432,906	222,914	773,023	1,673,015
Total.....	47,916,971	9,529,936	28,164,853	3,099,200	88,797,800	109,198,588

<sup>1</sup> Areas known; other figures estimated by proportion from those for reported farms.<sup>2</sup> \$4 per irrigable acre payable to Indians.<sup>3</sup> Land entered subject to reclamation act.<sup>4</sup> Includes vested water rights, \$86,940.

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*Estimated investment and value in irrigated farms on reclamation projects at close of 1914—Continued.*

State and project.	Increase during 1914.				Value.
	Acreage cleared and leveled.	Farmers' investment.			
		Clearing and leveling.	Improvements.	Total.	
Arizona: Salt River.....	9,263		\$102,839	\$70,312	\$1,448,653
Arizona-California: Yuma.....	5,154	\$221,128	51,566	710,157	500,000
California: Orland.....	180	36,156	47,809	201,115	364,930
Colorado: Uncompahgre Valley.....	2,445	12,225	78,320	76,120	168,950
Idaho:					
Boise—					
Farms reported.....	1,222	99,672	170,098	811,239	750,340
Farms not reported <sup>1</sup> .....	380	29,000	49,800	236,000	218,600
Minidoka—					
Gravity unit.....	1,857	246,026	158,565	683,070	736,875
South side pumping unit.....	3,333	109,962	39,356	237,788	387,746
Montana:					
Huntley.....	3,474	72,132	37,016	114,943	19,374
Milk River.....			5,000	15,000	12,000
Sun River.....	1,490	8,173	123,460	142,834	150,000
Montana-North Dakota: Lower Yellow-stone.....	1,438	6,000	35,000	100,000	80,000
Nebraska-Wyoming: North Platte.....	13,703	18,515	133,857	289,367	86,715
Nevada: Truckee-Carson.....	<sup>2</sup> 892	9,080	<sup>2</sup> 21,043	19,790	302,337
New Mexico:					
Carlsbad.....			200	8,000	500
Hondo.....			500	22,850	25,350
New Mexico-Texas: Rio Grande.....			96,787	269,855	298,660
North Dakota: North Dakota pumping.....			4,190	5,215	5,215
Oregon: Umatilla.....	<sup>2</sup> 1,157	9,676	<sup>2</sup> 261,239	<sup>2</sup> 315,382	<sup>2</sup> 562,395
Oregon-California: Klamath.....			6,000	16,000	
South Dakota: Belle Fourche.....	3,140	49,696	122,728	186,988	144,130
Washington:					
Okanogan.....	100	2,000	24,905	44,671	<sup>6</sup> 133,160
Yakima—					
Sunnyside unit.....	4,525	113,125	2,537,776	2,956,576	791,875
Tieton unit.....	2,070	5,230	50,000	100,000	300,000
Wyoming: Shoshone.....	2,500	25,239	<sup>2</sup> 10,251	41,591	188,615
Total.....	54,195	1,072,983	3,583,237	7,044,099	6,285,310

<sup>1</sup> Areas known; other figures estimated by proportion from those for reported farms.

<sup>2</sup> Decrease

Summary of farms irrigated on reclamation projects in 1914.<sup>1</sup>

State and project.	Irrigated farms.		Average per farm.						Value of land and improvements. <sup>2</sup>
	Number.	Irrigable acreage. <sup>1</sup>	Irrigable acreage.	Crop-ped acreage.	Crop value.	Farmers' investment.			
						Land and improvements inventory.	Total.		
Arizona: Salt River.....	3,068	194,866	63	56	\$1,317	\$9,887	\$1,800	\$11,747	\$12,423
Arizona-California: Yuma.....	698	35,985	51	38	1,016	5,993	1,201	6,895	6,000
California: Orland.....	296	8,638	29	25	596	6,167	1,158	6,325	7,000
Colorado: Uncompahgre Valley.....	910	52,338	57	37	956	2,713	953	3,666	4,230
Idaho:									
Boise—									
Farms reported.....	1,577	93,011	59	41	655	3,106	840	3,946	5,418
Farms not reported.....	331	27,100							
Minnesota—									
Gravity unit.....	1,151	66,110	57	40	575	3,249	905	4,154	4,257
South side pumping unit.....	563	37,900	67	64	993	2,673	1,117	3,790	4,768
Montana:									
Huntley.....	526	23,160	44	32	864	1,852	992	2,844	2,642
Milk River.....	86	6,800	161	61	962	2,216	2,187	4,403	4,940
Sun River.....	172	8,320	48	38	620	1,880	1,014	2,894	3,247
Montana-North Dakota: Lower Yellowstone.....	184	16,461	59	31	526	2,314	1,099	3,413	3,202
Nebraska-Wyoming: North Platte.....	944	74,216	79	64	943	2,849	1,044	3,893	3,588
Nevada: Truckee-Carson.....	504	52,039	103	73	875	6,486	1,678	8,164	8,108
New Mexico:									
Carlsbad.....	390	15,712	40	33	609	5,265	380	5,645	5,744
Hondo.....	26	3,025	121	49	47	858	9,800	1,278	11,078
New Mexico-Texas: Rio Grande.....	373	30,800	40	37	35	1,502	4,615	702	6,510
North Dakota: North Dakota pumping.....	44	2,485	56	24	24	530	1,951	569	2,500
Oregon: Umatilla.....	311	9,411	100	16	10	285	5,709	602	6,311
Oregon-California: Klamath.....	275	24,000	105	89	89	1,263	5,990	2,156	8,915
South Dakota: Belle Fourche.....	615	49,426	80	61	60	750	2,718	1,326	6,804
Washington:									
Okanogan.....	448	8,960	20	17	7	283	5,371	843	3,798
Yakima—									
Sunnyside unit.....	2,450	66,525	27	26	20	1,167	6,119	755	6,780
Tiecon unit.....	800	22,700	25	23	18	525	3,800	392	4,752
Wyoming: Shoshone.....	429	28,599	60	53	49	733	1,802	1,041	4,182
Total and average.....	17,619	864,187	54	43	40	936	5,040	1,062	3,900
									6,200

<sup>1</sup> Data are for calendar year or irrigation season, except on Salt River project, Arizona, data are for corresponding agricultural year October, 1913, to September, 1914. The figures in this table are derived largely from those in foregoing tables. Where this table gives figures per farm or per acre the totals for the same items are given in the preceding tables.

<sup>2</sup> Less than total irrigable acreage of projects, or acreage the Service could have supplied, as given in other tables because this table is restricted to farms actually irrigated.

<sup>3</sup> Includes purchase price of land, improvements, and paid construction (water-right) charges.

## Summary of farms irrigated on reclamation projects in 1914—Continued.

State and project.	Average per acre. <sup>1</sup>			Num-ber of irri-gated farms.	Increase during 1914.				Average per farm.				Average per acre. <sup>1</sup>			
	Farmers' Investment.				Irrigat-ed acre-age.	Crop-sav-erage.	Crop value.	Farmers' Investment.			Value of land and im-prove-ments. <sup>2</sup>	Farmers' Investment.			Value of land and im-prove-ments. <sup>2</sup>	
	Land and im-prove-ments.	Stock and equip-ment in-ven-tory.	Total.					Value of land and im-prove-ments. <sup>2</sup>	Stock and equip-ment in-ven-tory.	Total.						
Arizona: Salt River.....	\$156	\$29	\$185	388	4.6	.5	\$392	\$1,405	\$23	\$1,428	\$1,258	\$7,39	\$2,10	\$9,49	\$1,96	
Arizona-California: Yuma.....	111	24	135	82	4.3	5.1	23	383	49	432	150	19.90	2.33	22.23	6.00	
California: Orland.....	177	40	217	50	2.3	2.2	223	233	114	337	633	1.67	5.74	7.41	13.26	
Colorado: Uncompahgre Valley.....	47	17	64	22	1.8	2.1	165	18	54	219	86	1.96	1.47	3.43	4.00	
Idaho:																
Boise, farms reported.....	53	14	67	200	.1	1.1	72	138	39	177	242	5.22	1.43	6.65	1.38	
Mindoka.....																
Gravity unit.....	57	16	73	26	.7	1.2	48	935	102	1,037	556	16.61	1.89	18.50	10.21	
South side pumping unit.....	40	17	57	39	3	4	46	265	192	457	386	3.94	2.81	6.75	5.54	
Montana:																
Huntley.....	42	23	65	60	2.6	2.5	18	222	168	390	42	5.64	3.87	9.51	1.88	
Milk River.....	14	14	28	31	2.4	.6	266	426	508	928	477	1.77	2.31	4.08	.80	
Sun River.....	39	21	60	69	3	.1	36	871	268	1,139	.....	19.61	6.83	26.43	.....	
Montana-North Dakota: Lower Yellowstone.....	30	14	44	26	17	.16	117	138	83	220	48	5.96	3.00	8.96	6.76	
Nebraska: Wyoming: North Platte.....	36	13	49	36	1.4	8	77	206	149	355	45	3.23	2.04	5.27	.....	
Nevada: Truckee-Carson.....	63	16	79	70	8.8	3	248	91	206	315	439	5.77	3.48	9.25	12.07	
New Mexico:																
Carlsbad.....	101	7	108	28	6	4	64	385	10	395	446	1.00	.....	1.00	.....	
Hondo.....	81	11	92	72	7	10	211	10,100	1,380	11,480	412	40	3.00	29.00	32.00	
New Mexico-Texas: Rio Grande.....	116	18	134	11	1.6	1.6	690	409	.....	.....	472	4.14	2.44	6.58	3.07	
North Dakota: North Dakota pump-ing.....	51	15	66	33	8	6	110	461	27	488	262	.....	2.52	2.52	2.52	
Oregon: Umatilla.....	189	20	209	20	3	.1	15	1,014	59	1,073	1,908	.....	.....	.....	45.00	
Oregon-California: Klamath.....	57	21	78	65	23	22	243	801	970	1,771	383	1.05	6.55	7.60	16.32	
South Dakota: Belle Fourche.....	24	17	51	11	4.4	3.6	138	263	368	631	198	2.77	4.41	7.17	1.80	

	269	17	296	341	7	\$ .2	.9	38	15	\$ 32	\$ 17	\$ 461	\$ 7.00	\$ 2.00	\$ 9.00	\$ 31.00
Washington:																
Okanogan.....																
Yakima.....																
Sunnyside unit.....	225	28	233	175	2	2.3	3.1	14	1,203	57	1,260	320	38.00	1.80	39.80	.....
Tieton unit.....	150	15	165	240	160	.2	1	\$ 45	\$ 670	.8	\$ 678	\$ 700	\$ 10.00	1.00	\$ 9.00	.....
Wyoming: Shoshone.....	30	17	47	65	33	2.8	2.8	69	\$ 45	164	119	151	\$ 1.52	2.39	1.48	1.00
Total and average.....	93	20	112	114	1,133	.....	1	\$ 18	.....	60	.....	.....	.....	2.00	.....	.....

\* Per acre irrigable. \* Includes purchase price of land, improvements, preparation of surface for irrigation, and paid construction (water-right) charges. \* Decrease.



Water storage by United States Reclamation Service, 1914.<sup>1</sup>

[Reservoirs operated by service in 1914.]

State and project.	Reservoir.	Capacity in 1914.	Contents beginning of year.	Water entering reservoir during year.			Outflow.		Water leaving reservoir during year.				Contents and of year.
				Inflow.	Rain on reser- voir.	Total.	Irriga- tion use.	Wasted.	Evapo- ration.	Losses.			
										Total.	Seepage.		
											Total.	Mean area sub- merged.	
			<i>Acres- feet.</i>	<i>Acres- feet.</i>	<i>Acres- feet.</i>	<i>Acres- feet.</i>	<i>Acres- feet.</i>	<i>Acres- feet.</i>	<i>Acres- feet.</i>	<i>Acres.</i>	<i>Acres- feet.</i>	<i>Acres- feet.</i>	<i>Acres- feet.</i>
Arizona: Salt River	Roosevelt	1,367,300	193,173	628,907	8,209	637,116	616,659	84,533	43,896	660,754		158,535	9,000
California: Orland	East Park	45,600	16,300	115,700	2,364	118,064	33,654		7,177	125,364			
Idaho:													
Boise	Deer Flat	177,640	29,267	275,242	4,164	279,406	201,585			283,665	5,337	15.4	26,008
Minidoka	Lake Walcott	150,000	63,635	7,413,480	11,465	7,424,945	615,200	6,719,000	38,580	7,372,780		115,800	102,700
	Jackson Lake	380,000	1-9,000										
Montana:													
Milk River	Point of Rocks	880	0	2,948	95	2,943	2,057			651	89	7.3	235
Sun River	Willow Creek	16,700	11,700										0
Nebraska-Wyoming:	Pathfinder	1,070,000	287,720	1,552,790	9,180	1,561,970	1,418,620	9,650	65,090	1,501,960		347,700	6,446
North Platte	Lake Alice	11,400	6,446	96,972	842	97,814	43,737	39,250	2,024	97,814	581	22	0
Nevada:	Labontan	60,000	0			57,000	30,000	27,000		0			
Truckee-Carson	Lake Tahoe	750,000	120,000			429,740				177,740			372,000
New Mexico:													
Carlsbad	Lake McMillan	70,000	34,000	378,620	9,920	388,540		185,000	43,100	147,440	6,160	24	47,000
	Avalon	7,000	7,000	333,630	1,260	334,920	87,900	239,900	5,830	1,260	822	1.6	7,000
Hondo	Hondo	40,000	0			19,605				17,605			334,920
Oregon: Umatilla	Cold Springs	50,000	30,225	35,845	632	36,477	47,228		5,866	3,638	1,104	3.3	2,000
South Dakota: Belle	Belle Fourche	203,770	88,450	135,358	18,473	153,831	107,935		15,822	45,664	4,300	.98	9,950
Washington:													
Okanogan	Concomully	13,000	4,150	33,160	557	33,717	26,161	5,414		968		32,568	5,299
	Salmon Lake	2,600	180										2,220
Bumping Lake	Bumping Lake	34,000	1,480	223,739	2,691	226,420	226,880			226,880			1,020
Yakima	Lake Kachess	210,000	47,450	178,435	9,970	188,405	209,030			209,030			206,030
	Lake Kechelus	15,500	11,500			246,100	259,600			259,600			26,825
													0
													289,600

Wyoming: Shoshone.....	22,800	6,500	638,254	4,521	642,775	630,100	.....	.....	.....	630,100	19,175
Lake Cleelum.....	470,000	466,760	.....	.....	946,196	92,340	.....	.....	.....	990,896	442,060
Shoshone.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total.....	5,167,640	1,405,926	12,042,970	84,373	13,847,964	4,628,139	8,208,303	227,354	312,184	18,863	13,526,127
											1,772,823

<sup>1</sup> Exclusive of Indian projects constructed by Reclamation Service for Indian Service. Data are for calendar year, except on Salt River project data are for corresponding agricultural year, Oct. 1, 1913, to Sept. 30, 1914.

<sup>2</sup> Data incomplete.

<sup>3</sup> Negative storage refers to an assumed zero due to obstructions in outlet channel.

<sup>4</sup> Not operated for irrigation in 1914.

<sup>5</sup> Includes unaccounted for loss of 8,660 acre-feet.

<sup>6</sup> Under construction, making reliable records impossible, but a maximum of 57,000 acre-feet storage was obtained during 1914.

<sup>7</sup> Approximate figures. Lake Tahoe was not under control of Reclamation Service in 1914.

<sup>8</sup> Empties into Conconully Reservoir; data incomplete.

<sup>9</sup> Data approximate, due to construction operations during the year, affecting regulation and capacity.

<sup>10</sup> Over Corbett Dam.

Water diverted by Reclamation Service, 1914.<sup>1</sup>

State and project.	Diverted from—	Water diverted in acre-feet.												Acres ir- rigated. <sup>2</sup>	Diver- sion, ac- re- feet per acre.	
		Janu- ary.	Febru- ary.	March.	April.	May.	June.	July.	August.	Septem- ber.	Octo- ber.	Novem- ber.	Decem- ber.			Total.
Arizona: Salt River.....	Salt River.....	40,614	45,412	84,488	89,063	98,981	72,164	74,538	94,356	90,340	59,515	33,183	22,270	804,924	187,112	4.30
Arizona-California: Yuma.....	Colorado River.....	7,567	5,221	12,569	11,900	21,255	22,444	26,989	24,963	26,538	27,120	13,199	5,492	205,207	26,207	8.16
California: Orland.....	Stony Creek.....			871	3,619	9,033	8,963	8,062	9,187	7,803	2,589			50,147	7,354	6.82
Colorado: Uncompahgre Valley.....	Gunnison River <sup>1</sup>				337	2,939	3,773	11,806	18,200	19,398	10,463			66,906		
	Uncompahgre River.				11,291	25,031	34,661	39,758	31,795	23,255	16,385	1,166		183,342	32,911	5.66
Idaho: Boise.....	Boise River.....	23,053	21,960	46,455	70,326	131,971	116,809	47,854	5,401	13,687	11,678	5,132	1,339	495,665	83,714	5.92
Minnesota: Minnesota.....	Snake River.....				38,200	105,000	94,300	138,000	119,000	54,800	27,900			572,200	81,518	7.02
Montana: Huntley.....	Yellowstone River.					1,115	12,108	20,168	18,269	3,863				55,543	17,068	3.25
	Milk River.....				760	1,270	850	743			616			4,229	2,201	1.91
Sun River.....	Sun River.....					1,336	4,557	10,547	6,068	1,917	347			24,762	6,013	3.7
Montana-North Dakota: Lower Yellow- stone.	Yellowstone River.					2,528	6,229	9,878	4,968	735	1,401			26,769	5,743	4.5
Nebraska: Wyoming: North Platte River.	North Platte River.					50,464	83,252	87,692	87,472	69,000	38,100			415,980	67,700	6.16
Nevada: Truckee-Carson.	Carson River.....			17,126	30,369	40,682	42,687	39,166	28,902	18,660	7,962			228,554	36,990	6.16
New Mexico: Carlsbad.	Pecos River.....		2,580	2,740	16,720	10,600	7,010	16,600	19,800	11,970	880			87,900	12,690	6.9
Hondo.	Hondo River.....	20			29		4,242	14,675	204	27	157	494	2,935	22,753	1,224	18.61
New Mexico-Texas: Rio Grande. <sup>10</sup>	Rio Grande.....	4,730	13,266	16,384	28,324	32,981	29,740	17,413	28,529	15,778	10,611			197,646	28,443	16.30
North Dakota: North Dakota pumping.	Missouri River.....						687	804	1,180					2,671	1,066	2.53
Oregon: Umatilla.....	Umatilla River ..	13,001	9,685	9,229	14,940	10,266	4,985	1,010	560	604	2,141	4,138	2,866	73,435	5,100	14.2
Oregon-California: Klamath.	Lost River.....					771	1,061	1,313	823	218				4,176	980	4.26
	Upper Klamath Lake.					11,248	11,084	15,660	8,890	2,400				49,252	24,440	2.00
South Dakota: Belle Fourche.	Belle Fourche River.			11,413	17,102	25,438	14,612	6,584	20,026	1,360	18,688	15,980	14,136	145,284	37,454	3.88



*Distribution of water on reclamation projects, 1914.<sup>1</sup>*

State and project.	Acreage irrigated. <sup>a</sup>	Acre-feet diverted for direct use. <sup>a</sup>				Acre-feet unused.		Acre-feet delivered to project farms.		Per cent of diversion delivered.
		Natural flow.	Reser-voir flow. <sup>a</sup>	Pumped.	Total.	Wasted.	Lost. <sup>b</sup>	Total.	Per acre irrigated.	
Arizona: Salt River.....	187,112	511,896	284,531	30,481	806,908	5,055	355,122	446,731	2.62	55.5
Arizona-California: Yuma.....	25,207	201,848	3,859	3,859	205,707	55,088	56,152	83,187	3.06	45.4
California: Orland.....	7,854	24,558	25,638	.....	50,196	7,089	13,066	30,011	4.08	59.5
Colorado: Uncompahgre Valley.....	38,873	185,227	.....	.....	185,227	.....	113,959	171,268	5.06	92.5
Idaho: Boise.....	83,714	205,401	201,585	.....	406,986	8,778	139,028	219,905	2.62	62.1
Idaho: Minidoka.....	81,518	430,104	119,478	.....	549,582	9,437,710	236,886	277,148	3.40	50.5
Montana: Huntley.....	17,068	55,543	.....	.....	55,543	10,639	10,475	24,429	1.43	44.0
Montana: Milk River.....	2,201	3,276	.....	.....	3,276	181	1,335	1,700	.80	53.8
Montana: Sun River.....	6,613	24,762	.....	.....	24,762	3,471	9,823	11,468	1.73	46.3
Montana-North Dakota: Lower Yellowstone.....	5,743	25,769	.....	.....	25,769	3,138	13,488	9,143	1.59	35.4
Nebraska-Wyoming: North Platte.....	60,532	.....	.....	.....	415,990	38,654	152,899	176,915	2.92	54.0
Nevada: Truckee-Carson.....	39,516	.....	.....	.....	268,028	49,568	80,356	138,104	3.50	51.5
New Mexico: Carlsbad.....	12,690	.....	87,900	.....	87,900	8,244	48,756	30,900	2.44	35.3
New Mexico: Hondo.....	1,224	3,178	.....	.....	3,178	.....	2,070	1,108	.91	34.9
New Mexico-Texas: Rio Grande.....	26,442	236,332	.....	.....	236,332	.....	185,368	161,553	6.68	76.5
North Dakota: North Dakota pumping.....	1,056	.....	.....	.....	17,671	20	7,732	1,791	1.70	72.0
Oregon: Umatilla.....	5,100	15,501	47,227	.....	62,728	1,281	25,147	36,300	7.11	58.0
Oregon-California: Klamath.....	24,440	49,253	4,176	.....	53,428	1,355	21,401	30,673	1.26	57.4
South Dakota: Belle Fourche.....	37,454	3,526	106,625	.....	110,461	7,988	48,211	54,262	1.45	46.2
Washington: Okanogan.....	7,740	684	31,550	.....	32,234	5,389	6,810	20,035	2.59	62.2
Washington: Yakima.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Washington: Sunnyside.....	66,525	288,563	51,310	.....	309,903	17,399	88,000	204,504	3.07	66.1
Washington: Tieton.....	20,900	38,102	29,686	.....	67,788	6,237	18,453	43,099	2.09	63.6
Wyoming: Shoshone.....	22,226	92,340	.....	.....	18,92,340	4,568	24,061	52,789	2.38	57.2
Total and average.....	777,948	2,364,342	970,016	37,011	4,055,377	288,122	1,432,397	2,236,851	2.87	57.6

<sup>1</sup> Data are for calendar year (irrigation season), except for Salt River project, Arizona, data are for corresponding agricultural year ending Sept. 30, 1914.

<sup>2</sup> Figures do not agree in all cases with those in other tables because of inclusion here of areas under private canals supplied through project systems, etc.

<sup>3</sup> Water entering canal systems for immediate irrigation. Exclusive of water diverted for filling storage reservoirs.

<sup>4</sup> Stored water.

<sup>5</sup> Seepage and evaporation.

<sup>6</sup> Includes 50,518 acre-feet returned to river through wasteway channels.

<sup>7</sup> Exclusively small amounts and high efficiency, due in part to seepage into project system from higher lands.

<sup>8</sup> Of this amount, 10,818 acre-feet were delivered to Pioneer Irrigation district, 13,365 to Riverside Canal, 8,974 to Deer Flat Reservoir from Deer Flat High Line Canal, and 6,328 acre-feet were used for stock water at construction purposes, all of which are included in computing per cent of diversion delivered.

<sup>9</sup> 8,162 acre-feet returned to canals by wasteways and pumps.

<sup>10</sup> Of this amount, 18,948 acre-feet wasted by pumps.

<sup>11</sup> 73 per cent of the water being waste from pumps.

<sup>12</sup> Eight per cent loss because canal system was used only to small part of its capacity.

<sup>13</sup> Of this amount, 41,547 acre-feet were delivered to North Platte Canal & Colonization Co. and 5,965 acre-feet were delivered to Lake Alice and not withdrawn into canal system.

<sup>14</sup> These include Truckee Canal diversion, 25,680 acre-feet to 3,050 acres, or 7.35 per acre; unsettled Carson rights, 43,374 acre-feet to 10,865 acres, or 3.99 per acre, and Carson diversion rights, 71,700 acre-feet to 25,604 acres, or 2.80 per acre.

<sup>15</sup> Of this amount, 18,412 acre-feet delivered for and sold by water users to Berino ditch; included in computing per cent of diversion delivered.

<sup>16</sup> Includes 49,685 acre-feet waste and loss from service canals and 5,683 less from community canals.

<sup>17</sup> 128 acre-feet used at power house.

<sup>18</sup> Includes 2,212 acre-feet seepage from Cold Springs drain.

<sup>19</sup> Of this amount, 652 acre-feet remained in Kallston Reservoir at close of season.

## FINANCES.

## RECEIPTS, ALLOTMENTS, AND INVESTMENT, BY STATES.

The table following gives a statement of additions to the reclamation fund from the sale of public lands, by States, and also shows the amounts allotted and the net investment of the Government for irrigation work in each of the reclamation States.

TABLE 1.—Receipts from the sale of public lands, allotments, and net investment, by States.

States.	Actual receipts from sales of public land, exclusive of town-site sales, transferred to credit of reclamation fund.		Estimated receipts with Treasury United States on June 30, 1915, not yet audited.	Total estimated receipts from sales of public land, exclusive of town-site sales, to June 30, 1915.
	Fiscal year 1915.	To June 30, 1915.		
Arizona.....	\$118,433.17	\$1,284,130.05	\$34,500.00	\$1,318,630.05
California.....	413,731.59	5,772,674.62	162,000.00	5,934,674.62
Colorado.....	439,486.51	7,120,478.44	279,500.00	7,399,978.44
Idaho.....	298,701.87	5,336,410.77	145,800.00	5,482,210.77
Kansas.....	16,776.75	979,856.82	9,000.00	995,556.82
Montana.....	1,192,612.56	10,064,721.04	472,000.00	10,536,721.04
Nebraska.....	134,545.32	1,798,559.15	39,000.00	1,837,559.15
Nevada.....	60,402.61	601,999.57	26,000.00	627,999.57
New Mexico.....	289,096.97	4,228,887.92	124,200.00	4,358,087.92
North Dakota.....	116,597.54	12,038,495.97	42,500.00	12,080,995.97
Oklahoma.....	38,598.88	5,822,156.72	10,500.00	5,832,556.72
Oregon.....	206,381.17	10,620,309.39	97,500.00	10,717,809.39
South Dakota.....	235,281.81	7,059,059.97	59,000.00	7,118,059.97
Utah.....	39,862.95	1,930,342.29	45,500.00	1,975,842.29
Washington.....	156,190.51	6,589,490.24	67,500.00	6,656,990.24
Wyoming.....	346,019.94	4,666,920.40	55,500.00	4,722,420.40
Total.....	4,100,720.65	85,914,493.36	1,670,000.00	87,584,493.36

States.	Allotments.		Net investment.	
	Fiscal year 1915.	To June 30, 1915.	Fiscal year 1915.	To June 30, 1915.
Arizona.....	\$3,150,193.64	\$20,758,209.26	\$1,091,373.23	\$16,964,394.05
California.....	216,075.23	3,264,242.98	363,740.05	2,787,804.53
Colorado.....	<sup>1</sup> 73,213.00	8,992,375.75	1,576,234.35	8,069,041.01
Idaho.....	1,124,702.00	19,081,711.61	1,830,477.73	15,912,676.10
Kansas.....	<sup>1</sup> 23,000.00	896,000.00	156.11	376,185.27
Montana.....	267,021.07	11,562,930.62	2,218,563.47	9,591,740.94
Nebraska.....	<sup>1</sup> 317,100.00	5,285,277.01	288,779.13	4,605,155.06
Nevada.....	196,027.00	6,496,503.63	373,596.85	5,787,836.29
New Mexico.....	375,072.60	5,069,482.03	1,248,688.80	4,111,130.56
North Dakota.....	41,634.03	2,319,390.27	26,670.77	1,977,691.15
Oklahoma.....	<sup>1</sup> 43,000.00	126,500.44	5,634.76	78,487.63
Oregon.....	<sup>1</sup> 982,476.04	4,662,054.78	497,189.11	3,758,812.32
South Dakota.....	163,057.69	3,729,691.73	186,915.14	3,326,701.88
Texas.....	215,342.40	2,298,900.00	769,174.80	1,877,704.28
Utah.....	<sup>1</sup> 219,000.00	3,241,018.37	254,265.89	2,642,830.59
Washington.....	<sup>1</sup> 272,154.99	10,470,486.68	789,337.28	7,648,875.87
Wyoming.....	<sup>1</sup> 222,282.00	7,055,517.38	279,063.47	6,096,626.69
Secondary projects.....	96,600.00	154,072.89	.....	.....
Preliminary investigations.....	<sup>1</sup> 511.27	.....	.....	.....
General accounts.....	6,606,043.35	6,997,833.35	3,807.44	126,319.76
Total.....	11,742,041.78	121,951,997.78	11,803,665.88	95,715,723.92

<sup>1</sup> Reduction, due to previous allotments being in excess of authorized expenditures for fiscal year 1915.

# ALLOTMENTS AND NET INVESTMENT, BY PROJECTS AND BY STATES.

This statement shows the amount of money allotted to each project, the amount of money expended on each project to June 30, 1915, and the amount of money allotted to States and expended in the respective States for the same period:

TABLE 2.—Statement of project allotments and net investment, by States, to June 30, 1915.

State and project.	Per cent chargeable to State.	Allotments.		Net investment.	
		Fiscal year 1915.	To June 30, 1915	Fiscal year 1915.	To June 30, 1915.
<b>Arizona:</b>					
Salt River.....		\$2,219,425.00	\$13,393,000.00	\$334,602.36	\$10,431,275.09
Yuma.....	83	910,018.64	7,190,290.00	709,797.52	6,373,448.75
Colorado River.....	83		36,279.30		36,279.30
Colorado River Basin.....	83	20,750.00	62,250.00	46,973.35	47,000.96
Little Colorado.....			9,554.33		9,554.33
San Carlos.....			24,829.51		24,829.51
San Pedro.....			2,427.34		2,427.34
Preliminary investigations.....			39,578.78		39,578.78
Total.....		3,150,193.64	20,758,209.26	1,094,373.23	16,964,394.05
<b>California:</b>					
Yuma.....	17	186,389.36	1,472,710.00	145,380.21	1,305,405.17
Orland.....		37,000.00	955,000.00	156,742.21	787,961.02
Klamath.....	25	128,250.00	720,000.00	45,284.75	596,736.75
Colorado River.....	17		7,430.70		7,430.70
Colorado River Basin.....	17	4,250.00	12,750.00	9,621.06	9,626.70
Iron Canyon.....		9,185.96	19,185.96	3,011.30	9,777.33
Pit River.....			2,500.00	2,398.93	2,398.93
Shasta County.....		2,500.00	2,500.00	40.45	40.45
Lassen County.....		5,000.00	5,000.00	1,261.15	1,261.15
Owens Valley.....			12,061.92		12,061.92
Sacramento Valley.....			43,620.72		43,620.72
San Joaquin.....			3,531.20		3,531.20
Preliminary investigations.....			7,952.48		7,952.48
Total.....		216,075.32	3,264,242.98	363,740.05	2,787,804.52
<b>Colorado:</b>					
Grand Valley.....		151,313.00	2,665,300.00	1,252,915.48	2,359,251.08
Uncompahgre.....		122,000.00	6,319,000.00	323,318.87	5,701,714.18
White River.....			4,357.00		4,357.00
Preliminary investigations.....			3,718.75		3,718.75
Total.....		173,313.00	8,992,375.75	1,576,234.35	8,069,041.01
<b>Idaho:</b>					
Boise.....		131,051.00	12,405,700.00	1,506,620.52	10,905,780.89
Minidoka.....		990,651.00	6,652,500.00	322,899.84	4,986,211.82
Dubois.....			17,228.91		17,228.91
Port Neuf.....			2,168.01		2,168.01
General investigations.....		3,000.00	4,000.00	842.68	1,191.78
King Hill.....			114.69	114.69	114.69
Total.....		1,124,702.00	19,081,711.61	1,830,477.73	15,912,676.10
Kansas: Garden City.....		123,000.00	396,000.00	156.11	376,186.27
<b>Montana:</b>					
Huntley.....		269,594.00	1,787,000.00	145,350.65	1,162,854.63
Milk River.....		1382,983.96	2,633,000.00	553,777.99	2,274,832.44
Milk River, St. Mary storage.....		494,092.96	1,936,000.00	697,690.73	1,507,881.24
Sun River.....		191,828.00	2,751,000.00	798,476.05	2,248,281.34
Lower Yellowstone.....	70	121,853.93	2,400,146.07	23,146.90	2,242,506.74
Clark Fork.....			5,581.23		5,581.23
Crow Reservation.....			18,911.96		18,911.96
Lake Basin.....			7,103.26		7,103.26
Madison River.....			10,729.09		10,729.09
Marías.....			13,459.01	121.15	13,459.01
Total.....		267,021.07	11,562,930.62	2,218,563.47	9,591,740.94

<sup>1</sup> Reduction, due to previous allotments being in excess of authorized expenditures for fiscal year 1915.



TABLE 2.—Statement of project allotments and net investment, by States, to June 30, 1915—Continued.

State and project.	Per cent chargeable to State.	Allotments.		Net investment.	
		Fiscal year 1915.	To June 30, 1915.	Fiscal year 1915.	To June 30, 1915.
<b>Nebraska:</b>					
North Platte.....	70	<sup>1</sup> \$317,100.00	\$5,272,400.00	\$285,638.17	\$4,601,896.35
Investigations.....			10,000.00	3,140.96	3,381.70
South Platte.....			2,877.01		2,877.01
<b>Total.....</b>		<sup>1</sup> 317,100.00	5,285,277.01	288,779.13	4,608,155.06
<b>Nevada:</b>					
Truckee-Carson.....		192,027.00	6,470,000.00	372,696.41	5,774,435.22
Walker River.....			12,503.63		12,503.63
Walker River investigations.....		4,000.00	4,000.00	900.44	900.44
<b>Total.....</b>		196,027.00	6,486,503.63	373,596.85	5,787,839.29
<b>New Mexico:</b>					
Carlsbad.....		120,169.00	1,179,000.00	96,204.17	882,899.37
Hondo.....		<sup>1</sup> 71,110.00	401,000.00	4,904.65	367,257.11
Rio Grande.....	60	99,060.00	1,012,200.00	307,750.80	790,152.85
Rio Grande, Elephant Butte.....	60	226,953.80	2,424,000.00	839,827.18	2,027,548.20
La Plata.....			28,064.33		28,064.33
Las Vegas.....			5,014.09		5,014.09
Urton Lake.....			17,464.70		17,464.70
Preliminary investigations.....			2,738.91		2,738.91
<b>Total.....</b>		375,072.80	5,069,482.03	1,248,686.80	4,111,139.56
<b>North Dakota:</b>					
North Dakota pumping.....		51,000.00	1,229,000.00	17,028.57	954,860.59
Lower Yellowstone.....	30	<sup>1</sup> 9,365.97	1,028,634.03	9,920.10	961,074.32
Bismarck.....			13,621.69		13,621.69
Little Missouri.....			11,933.52		11,933.52
Nesson.....			17,471.83		17,471.83
Washburn.....			10,531.53		10,531.53
Bowman.....			3,236.64	<sup>2</sup> 277.90	3,236.64
Preliminary investigations.....			4,961.03		4,961.03
<b>Total.....</b>		41,634.03	2,319,390.27	26,670.77	1,977,691.15
<b>Oklahoma:</b>					
Lawton.....		<sup>1</sup> 43,000.00	57,000.00	8,536.54	8,987.19
Cimarron.....			8,891.17	<sup>2</sup> 3,301.78	8,891.17
Red River.....			60,209.27		60,209.27
Investigations.....			400.00	400.00	400.00
<b>Total.....</b>		<sup>1</sup> 43,000.00	126,500.44	5,634.76	78,487.63
<b>Oregon:</b>					
Umatilla.....	75	<sup>1</sup> 456,000.00	2,304,000.00	328,550.87	1,786,918.19
Klamath.....		<sup>1</sup> 84,750.00	2,160,000.00	135,854.27	1,790,210.24
Central Oregon.....			40,346.41		40,346.41
Columbia River.....		5,012.47	20,012.47	10,350.21	16,482.01
Malheur.....			83,490.62		83,490.62
Oregon Cooperative.....		<sup>1</sup> 446,738.51	53,261.49	22,433.76	40,421.06
Preliminary investigations.....			943.79		943.79
<b>Total.....</b>		<sup>1</sup> 982,476.04	4,662,064.78	497,189.11	3,758,812.32
<b>South Dakota:</b>					
Belle Fourche.....		163,057.69	3,712,773.69	186,915.14	3,312,883.84
Preliminary investigations.....			16,818.04		16,818.04
<b>Total.....</b>		163,057.69	3,729,591.73	186,915.14	3,329,701.88
<b>Texas:</b>					
Rio Grande.....	40	66,040.00	674,800.00	205,167.20	520,101.90
Rio Grande, Elephant Butte.....		151,302.40	1,616,000.00	559,884.79	1,351,698.80
Pecos River.....		<sup>1</sup> 2,000.00	8,000.00	4,122.31	5,908.53
<b>Total.....</b>		215,342.40	2,298,800.00	769,174.30	1,877,704.23

<sup>1</sup> Reduction, due to previous allotments being in excess of authorized expenditures for fiscal year 1915.

TABLE 2.—Statement of project allotments and net investment, by States, to June 30, 1915—Continued.

State and project.	Per cent chargeable to State.	Allotments.		Net investment.	
		Fiscal year 1915.	To June 30, 1915.	Fiscal year 1915.	To June 30, 1915.
<b>Utah:</b>					
Strawberry Valley.....		<sup>1</sup> \$219,000.00	\$3,188,000.00	\$264,124.54	\$2,589,511.22
Bear Lake.....			18,827.72		18,827.72
Utah Lake.....			34,049.30		34,049.30
Provo-Webber.....			141.35	141.35	141.35
<b>Total.....</b>		<sup>1</sup> 219,000.00	3,241,018.37	254,265.89	2,642,529.59
<b>Washington:</b>					
Okanogan.....		95,750.00	905,000.00	89,885.59	716,072.01
Yakima Storage.....		361,717.00	2,082,000.00	325,999.52	1,728,447.26
Yakima Sunnyside.....		445,396.00	3,614,000.00	305,650.82	2,114,747.78
Yakima Tieton.....		442,335.43	3,703,205.43	64,989.60	2,923,237.26
Benton.....		<sup>1</sup> 14,000.00	11,105.05	<sup>2</sup> 31.20	11,105.05
Kittitas.....		<sup>1</sup> 22,000.00	19,366.90		19,366.90
Wapato.....		<sup>1</sup> 40,000.00	26,465.77		26,465.77
Palouse.....			76,393.01		76,393.01
Palouse Cooperative.....		2,956.56	12,956.56	2,842.95	10,047.87
Priest Rapids.....			6,216.01		6,216.01
Preliminary investigations.....			3,776.95		3,776.95
<b>Total.....</b>		1,272,154.99	10,470,485.68	789,337.28	7,645,875.87
<b>Wyoming:</b>					
North Platte.....	30	<sup>1</sup> 135,900.00	2,259,600.00	122,416.36	1,972,241.30
Shoshone.....		<sup>1</sup> 186,482.00	4,787,000.00	156,647.11	4,088,467.01
De Smet.....			8,917.38		8,917.38
<b>Total.....</b>		<sup>1</sup> 322,382.00	7,055,517.38	279,063.47	6,069,625.69
<b>Secondary projects.....</b>		96,500.00	154,072.89		
Preliminary investigations.....		<sup>1</sup> 511.27			
General accounts.....		6,605,043.35	6,997,833.35	3,807.44	126,319.76
<b>Total.....</b>		6,701,032.08	7,151,906.24	3,807.44	126,319.76
<b>Grand total.....</b>		11,742,041.78	121,951,997.78	11,808,665.88	95,715,723.92

<sup>1</sup> Reduction, due to previous allotments being in excess of authorized expenditures for fiscal year 1915.<sup>2</sup> Credit.

## RECEIPTS FROM SALES OF PUBLIC LANDS.

During the fiscal year 1914 the General Land Office collected from the sales of public lands, not including town-site sales, a total of \$4,058,991.61, which resulted in the addition to the fund of \$3,460,451.63. The amount added to the fund was 85.229 per cent of the amount collected. During the fiscal year 1915 the gross receipts were approximately \$3,628,262.41. Of this amount, \$1,552,281.79 has been credited to the reclamation fund, and it is estimated that there is a balance of \$1,670,000, which will be available before the end of the calendar year.

Table 2, page 33, of the Tenth Annual Report gives a statement of the gross proceeds of sales and the corresponding receipts to the reclamation fund for each fiscal year from 1901 to 1910, inclusive; Table 2, page 269, of the Eleventh Annual Report gives the gross proceeds of sales for the fiscal year 1911; Table 2, page 297, of the Twelfth Annual Report gives the gross proceeds of sales for the fiscal year 1912; while Table 3, page 460, of the Thirteenth Annual Report gives the proceeds of sales for the fiscal year 1913.

TABLE 3.—*Total receipts from the sale of public lands and resulting additions to the reclamation fund.*

Fiscal year.	Total receipts from sale of public lands in reclamation States (not including town-site sales).	Additions to reclamation fund.	
		Amount (not including town-site receipts).	Per cent of total receipts.
1901-1913, inclusive.....	\$88,832,895.98	\$80,901,759.94	91.071
1914.....	4,058,991.61	3,480,451.63	85.229
1915.....	3,428,282.41	13,222,281.79	88.811
Total .....	96,320,050.00	87,584,493.36	90.742

<sup>1</sup> Actual receipts to Dec. 31, 1914, \$1,552,281.79; balance estimated.

## ALLOTMENTS, BY PROJECTS.

When funds become available, annual allotments are made by the Secretary of the Interior, in pursuance of which work is carried on. Table No. 4, below, gives a statement of the allotments from 1902 to June 30, 1915.

TABLE 4.—Allotments for primary and secondary projects and general expenses to June 30, 1915.

State and project.	Per cent charge-able to State.	Fiscal years 1902-1914.	Changes during fiscal year 1915.		Total allotments to June 30, 1915.	Analysis of allotments.	
			Reduction.	Addition.		Reclamation fund.	Bond loan.
Arizona: Salt River.....	88-17	\$11,173,575.00		\$2,219,425.00	\$13,393,000.00	\$12,398,000.00	\$495,000.00
Arizona-California: Yuma.....		7,566,592.00		1,096,408.00	8,663,000.00	7,468,000.00	1,200,000.00
California: Orland.....		918,000.00		37,000.00	955,000.00	955,000.00	
Colorado:							
Grand Valley.....		2,716,613.00	\$61,313.00		2,655,300.00	1,665,300.00	1,000,000.00
Uncompahgre.....		6,341,000.00	22,000.00		6,319,000.00	4,819,000.00	1,500,000.00
Idaho:							
Boise.....		12,274,649.00		131,081.00	12,405,730.00	10,405,700.00	2,000,000.00
Minidoka.....		5,661,849.00		990,651.00	6,652,500.00	6,652,500.00	
Kansas: Garden City.....		419,000.00	23,000.00		396,000.00	396,000.00	
Montana:							
Huntley.....		1,517,406.00		289,594.00	1,787,000.00	1,787,000.00	
Milk River.....		4,457,861.00		111,108.00	4,569,000.00	3,699,000.00	1,000,000.00
Sun River.....		2,942,828.00	91,828.00		2,751,000.00	2,751,000.00	
Montana-North Dakota: Lower Yellowstone.....	70-30	3,490,000.00	31,219.90		3,458,780.10	3,428,780.10	
Nebraska-Wyoming: North Platte.....	70-30	7,995,000.00	453,000.00		7,542,000.00	6,532,000.00	2,000,000.00
Nevada: Truckee-Carson.....		6,277,973.00		192,027.00	6,470,000.00	5,277,000.00	1,193,000.00
New Mexico:							
Carlsbad.....		1,068,831.00		120,106.00	1,179,000.00	1,179,000.00	
Hondo.....		4,472,110.00	71,110.00		4,401,000.00	4,401,000.00	
New Mexico-Texas: Rio Grande.....	60-40	5,183,644.00		543,356.00	5,727,000.00	1,227,000.00	4,500,000.00
North Dakota: North Dakota pumping.....		1,178,000.00		61,000.00	1,239,000.00	1,239,000.00	
Oklahoma: Lawton.....		100,000.00			57,000.00	57,000.00	
Oregon: Umatilla.....		2,760,000.00	43,000.00		2,394,000.00	1,979,000.00	324,000.00
Oregon-California: Klamath.....	75-25	2,993,000.00	456,000.00		2,537,000.00	2,280,000.00	600,000.00
South Dakota: Belle Fourche.....		3,549,716.00	113,000.00		3,712,716.00	3,712,716.00	
Utah: Strawberry Valley.....		3,407,000.00	219,000.00		3,188,000.00	916,000.00	2,272,000.00
Washington:							
Okanogan.....		809,250.00		95,750.00	905,000.00	905,000.00	
Yakima.....		8,149,757.00		1,249,448.43	9,399,205.43	7,494,205.43	1,915,000.00
Wyoming: Shoshone.....		4,973,482.00	196,422.00		4,787,000.00	4,787,000.00	
Secondary projects.....		1,496,000.00	371,533.32		1,117,416.48	1,117,416.48	
Preliminary investigations.....		81,000.00	511.27		80,488.73	80,488.73	
General accounts.....		362,790.00		6,605,043.35	6,997,833.35	6,997,833.35	
<b>Total.....</b>		<b>110,209,956.00</b>	<b>2,133,047.66</b>	<b>13,875,086.47</b>	<b>121,951,997.78</b>	<b>101,951,997.78</b>	<b>20,000,000.00</b>

### RECONCILING ADMINISTRATIVE ACCOUNTS WITH TREASURY DEPARTMENT BALANCES AND STATEMENTS.

The accounts of the Treasury Department are limited to the movement of cash, either by withdrawal or deposit to the appropriations involved. The administrative accounts of the Reclamation Service, as entered in the tables herein, show the amount, both for receipts and disbursements, upon an accrual basis. The cash account, however, must, if correct, agree with the Treasury Department statement of funds made available by appropriations, reimbursements, expenditures, and withdrawals. Table 5, below, shows a condensed statement of cash collected, appropriated, disbursed, and on hand, and Table 6 gives a reconciliation of the amounts of the appropriations, withdrawals, and balances used in the preparation of these financial tables, with the figures shown by the statements of the Treasury Department.

TABLE 5.—*Reclamation fund account to June 30, 1915.*

Item.	Debit.	Credit.
Balance end of fiscal year, as per Thirteenth Annual Report, page 462.....		\$82,076,060.37
Receipts during fiscal year 1915:		
Appropriation warrant—		
No. 25, Aug. 31, 1914.....	\$889,010.53	
No. 32, Sept. 30, 1914.....	900,115.65	
No. 34, Sept. 30, 1914.....	4,834.35	
No. 51, Dec. 31, 1914.....	2,365.43	
No. 55, Jan. 21, 1915.....	759,312.68	
No. 76, Mar. 31, 1915.....	3,704.59	
No. 81, Apr. 27, 1915.....	807,123.09	
No. 86, June 12, 1915.....	745,158.70	
No. 92, June 30, 1915.....	7,531.91	
Special reclamation fund, reimbursable act of June 25, 1910 (36 Stat., 835)—		4,119,156.93
Balance end of fiscal year 1914, as per Thirteenth Annual Report Table No. 5.....		3,500,000.00
No. 2, July 1, 1914.....	\$1,000,000.00	
No. 10, July 31, 1914.....	1,000,000.00	
No. 22, Aug. 27, 1914.....	1,000,000.00	
No. 44, Nov. 24, 1914.....	1,000,000.00	
No. 48, Dec. 19, 1914.....	2,000,000.00	
No. 62, Mar. 1, 1915.....	1,000,000.00	
No. 72, Mar. 30, 1915.....	500,000.00	
No. 80, Apr. 27, 1915.....	500,000.00	
No. 86, June 3, 1915.....	500,000.00	
Total.....		8,500,000.00
Disbursements, 351,136 vouchers, as per Table 7.....	\$111,095,700.51	98,195,217.30
Collections, 104,884 vouchers, as per Table 8.....		15,379,976.59
Balance with Treasurer United States, as per Table 6.....	984,722.55	
Balance with special fiscal agents.....	1,214,046.89	
Town sites appropriation credited to projects.....	280,723.94	
Total.....	113,575,193.89	113,575,193.89

TABLE 6.—*Balances of reclamation fund with the Treasurer of the United States, June 30, 1915.*

Item.	Appropriation.	Withdrawals.	Balances.
Total and balance end of fiscal year 1914, as per Thirteenth Annual Report, page 462, Table 5.....	\$85,578,060.37	\$85,065,412.85	\$510,647.52
Fiscal year 1915:			
Reclamation fund.....	4,119,156.93	12,090,225.78	528,981.15
Special reclamation fund, reimbursable, act of June 25, 1910 (36 Stat., 835).....	8,500,000.00		
Total and balance as per statement of the Treasury Department.....	98,195,217.30	97,155,638.63	1,039,578.67
For items in Reclamation Service accounts, but not included in above add withdrawals on direct settlements by the auditor.....	\$83,616.96		
Deduct repayments on direct settlements.....	8,760.86		
Total.....	98,195,217.30	97,210,494.75	984,722.55

**DISBURSEMENTS, COLLECTIONS, AND TRANSFERS.**TABLE 7.—*Disbursement vouchers paid to June 30, 1915.*

Fiscal year.	Quarter ended—	Number of vouchers.	Amount.
Balance from Thirteenth Annual Report.....		308, 774	\$96, 882, 527. 61
1915.....	(Sept. 30, 1914	11, 125	3, 515, 467. 15
	Dec. 31, 1914	11, 577	3, 889, 951. 53
	Mar. 31, 1915	9, 441	3, 292, 897. 71
	June 30, 1915	10, 219	3, 514, 966. 51
Total to June 30, 1915.....		351, 136	111, 095, 700. 51

TABLE 8.—*Collection vouchers collected to June 30, 1915.*

Fiscal year.	Quarter ended—	Number of vouchers.	Amount.
Balance from Thirteenth Annual Report.....		69, 957	\$12, 970, 469. 57
1915.....	(Sept. 30, 1914	4, 405	576, 457. 95
	Dec. 31, 1914	13, 598	750, 690. 89
	Mar. 31, 1915	8, 424	462, 779. 13
	June 30, 1915	8, 500	619, 579. 05
Total to June 30, 1915.....		104, 884	15, 379, 976. 50

TABLE 9.—*Transfer vouchers approved to June 30, 1915.*

Fiscal year.	Quarter ended—	Number of vouchers.	Amount.
Balance from Thirteenth Annual Report.....		7, 196	\$5, 168, 878. 94
1915.....	(Sept. 30, 1914	338	180, 526. 55
	Dec. 31, 1914	336	202, 192. 78
	Mar. 31, 1915	261	127, 933. 32
	June 30, 1915	206	125, 134. 93
Transferred to disbursement vouchers.....			<sup>1</sup> 777, 777. 15
Total to June 30, 1915.....		8, 337	5, 006, 759. 37

<sup>1</sup> Contra entry, adjustment of closed accounts.**INVESTMENT OF THE UNITED STATES IN PROJECTS.**

Below is given a statement showing cash disbursed and received on account of the several projects and transfers between projects. The work of the service is grouped under four general heads, as follows: Primary projects, those for which specific allotments of funds are in effect and on which construction is under way; secondary projects, those for which general allotments of funds have been made for all such work as a whole and on which only preliminary studies and surveys have been made to determine their advisability and practicability; Indian irrigation projects; and general accounts, which represent those expenditures that are general in nature and are not directly chargeable to any project when first incurred, but which become a charge against all projects as a part of the general or overhead expenses of the service.

Table 10 gives the voucher transactions and net investments of the United States on the several primary projects to June 30, 1915; Table 11 gives the voucher transactions on secondary projects; and Table 12 gives the voucher transactions and net investment of the United States on Indian irrigation projects and miscellaneous to June 30, 1915.

TABLE 10.—*Voucher transactions and net investment of the United States on primary projects to June 30, 1915.*

State and project.	Debits.			
	Disbursement vouchers.		Transfers received.	
	Fiscal year 1915.	To June 30, 1915.	Fiscal year 1915.	To June 30, 1915.
Arizona: Salt River.....	\$748,930.01	\$12,783,971.50	\$26,887.95	\$393,187.26
Arizona-California: Yuma.....	952,349.73	8,186,033.32	23,465.60	216,302.65
California: Orland.....	215,041.08	858,313.33	5,555.40	43,642.72
Colorado:				
Grand Valley.....	1,215,164.52	2,266,415.63	42,907.31	103,903.95
Uncompahgre.....	379,796.35	6,006,804.08	8,680.54	140,259.58
Idaho:				
Boise.....	1,633,081.71	11,199,420.80	55,491.94	381,050.79
Minidoka.....	402,540.65	5,870,823.94	18,180.25	292,663.26
Kansas: Garden City.....	161.04	380,080.56	187.86	11,734.81
Montana:				
Huntley.....	161,481.82	1,667,531.54	17,378.48	79,978.93
Milk River.....	556,693.07	2,316,258.54	16,904.24	124,490.22
St. Mary.....	658,789.82	1,424,200.95	77,240.80	186,051.33
Sun River.....	828,471.32	2,372,215.24	20,741.45	135,467.17
Montana-North Dakota: Lower Yellowstone.....	52,917.01	3,269,410.42	2,340.94	100,488.45
Nebraska-Wyoming: North Platte.....	486,709.67	7,024,662.96	12,037.89	186,258.88
Nevada: Truckee-Carson.....	445,520.66	6,076,958.74	13,406.72	276,365.74
New Mexico:				
Carlsbad.....	114,892.79	1,129,437.55	4,012.41	33,519.31
Hondo.....	5,314.55	387,018.53	474.70	13,829.69
New Mexico-Texas:				
Rio Grande.....	519,044.43	1,401,787.91	24,010.15	72,665.74
Elephant Butte storage.....	1,422,579.48	3,437,166.31	53,115.87	205,626.22
North Dakota: North Dakota pumping.....	38,365.10	1,021,445.61	2,149.47	195,603.58
Oklahoma: Lawton.....	7,165.66	7,616.31	1,385.88	1,385.88
Oregon: Umatilla.....	352,853.86	2,146,671.79	7,990.82	66,232.06
Oregon-California: Klamath.....	190,824.95	2,782,672.26	5,965.08	76,210.32
South Dakota: Belle Fourche.....	228,016.59	3,587,115.57	5,775.54	91,106.19
Utah: Strawberry Valley.....	262,521.20	2,684,402.69	14,261.96	102,063.41
Washington:				
Okanogan.....	90,441.76	830,157.55	5,206.37	33,721.47
Yakima-Storage.....	425,870.38	1,730,122.85	36,998.48	181,857.61
Yakima-Sunnyside.....	371,296.37	3,377,600.45	23,845.83	21,383.51
Yakima-Tieton.....	125,038.87	3,218,538.20	9,626.66	460,001.78
Wyoming: Shoshone.....	205,525.30	4,490,853.72	10,629.90	161,246.97
Total.....	13,097,408.75	103,944,688.85	546,875.49	4,388,299.48

TABLE 10.—*Voucher transactions and net investment of the United States on primary projects to June 30, 1915—Continued.*

State and project.	Credits.					
	Collection vouchers.					
	Water-right charges.				Miscellaneous.	
	Construction.		Operation and main-tenance.		Fiscal year 1915.	To June 30, 1915.
	Fiscal year 1915.	To June 30, 1915.	Fiscal year 1915.	To June 30, 1915.		
Arizona: Salt River.....		\$100,000.00			\$433,852.19	\$2,582,502.74
Arizona-California: Yuma.....	\$72,479.43	215,901.69		\$44,345.55	42,685.04	370,012.88
California: Orland.....					63,256.82	109,007.43
Colorado:						
Grand Valley.....					4,877.50	7,375.04
Uncompahgre.....					62,439.91	413,836.53
Idaho:						
Boise.....					164,672.30	567,258.70
Minkola.....	23,657.48	398,456.51	\$24,728.95	259,209.60	33,981.43	308,967.35
Kansas: Garden City.....		142.50		104.50	18.94	4,560.67
Montana:						
Huntley.....	14,819.45	255,681.82	14,122.84	95,756.22	3,688.29	72,731.35
Milk River.....					9,354.58	32,673.05
St. Mary.....					27,647.10	48,402.30
Sun River.....	17,791.60	110,166.95	2,648.25	36,851.16	9,724.06	45,696.59
Montana-North Dakota:						
Lower Yellowstone.....	1,117.52	34,948.07	353.05	36,144.49	11,731.28	54,378.50
Nebraska - Wyoming:						
North Platte.....	53,528.51	237,121.61	22,708.13	274,142.49	13,794.75	98,268.40
Nevada: Truckee-Carson.....	29,044.63	264,335.17	21,431.40	157,653.14	23,489.09	108,166.63
New Mexico:						
Carlsbad.....	8,552.81	119,332.11	11,734.58	124,334.47	2,078.57	22,810.99
Hondo.....					884.60	32,799.59
New Mexico-Texas:						
Rio Grande.....					21,467.30	141,666.17
Elephant Butte storage.....					70,024.52	212,381.37
North Dakota: North Dakota pumping.....	1,165.39	7,847.52	340.35	13,307.15	21,688.71	58,084.74
Oklahoma: Lawton.....	8,726.10	196,112.26	6,364.16	65,096.61	9,329.43	71,762.60
Oregon: Umatilla.....						
Oregon-California: Klamath.....	11,014.88	277,705.88	1,679.02	110,624.25	2,969.61	52,113.47
South Dakota: Belle Fourche.....	25,508.64	123,622.50	15,733.19	106,837.06	5,204.41	87,218.01
Utah: Strawberry Valley.....					9,810.22	151,302.61
Washington:						
Okanogan.....	77.63	24,549.33		35,492.62	5,639.61	77,460.55
Yakima-Storage.....	100,000.00	100,000.00			26,598.10	62,645.74
Yakima-Sunnyside.....	41,195.76	633,530.91	34,961.69	477,286.88	9,223.80	99,173.04
Yakima-Tieton.....	34,395.05	225,484.81	1,445.89	124,939.68	2,176.85	75,790.47
Wyoming: Shoshone.....	30,065.42	240,529.26	13,157.73	105,119.20	13,176.17	166,362.58
Total.....	473,137.31	3,575,468.90	171,407.23	2,067,255.07	1,105,390.18	6,135,410.09

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TABLE 10.—*Voucher transactions and net investment of the United States on primary projects to June 30, 1915—Continued.*

State and project.	Credits—Continued.		Net investment of the United States.	
	Transfers issued.			
	Fiscal year 1915.	To June 30, 1915.	Fiscal year 1915.	To June 30, 1915.
Arizona: Salt River.....	\$7,372.41	\$63,380.93	\$334,602.36	\$10,431,275.09
Arizona-California: Yuma.....	5,573.13	93,221.93	855,177.73	7,678,853.92
California: Orland.....	597.45	4,987.60	156,742.21	787,961.02
Colorado:				
Grand Valley.....	278.85	3,093.46	1,252,915.48	2,359,251.08
Uncompahgre.....	2,718.11	31,512.95	323,318.87	5,701,714.18
Idaho:				
Boise.....	17,280.83	107,452.00	1,506,620.52	10,905,760.89
Minidoka.....	15,453.20	210,641.92	322,896.84	4,986,211.82
Kansas: Garden City.....	173.85	10,802.43	156.11	376,185.27
Montana:				
Huntley.....	879.07	160,496.45	145,350.65	1,162,854.63
Milk River.....	10,464.74	33,243.27	553,777.99	2,374,832.44
St. Mary.....	10,692.79	54,468.74	697,690.73	1,507,381.24
Sun River.....	20,572.81	66,586.37	798,476.05	2,248,381.34
Montana-North Dakota: Lower Yellowstone.....	8,989.10	40,846.75	33,067.00	3,203,581.06
Nebraska-Wyoming: North Platte.....	665.64	27,251.69	408,054.53	6,574,137.65
Nevada: Truckee-Carson.....	12,264.85	48,734.32	372,696.41	5,774,435.22
New Mexico:				
Carlsbad.....	335.07	13,579.92	96,204.17	882,899.37
Hondo.....		791.52	4,904.65	367,267.11
New Mexico-Texas:				
Rio Grande.....	8,609.28	32,532.73	512,918.00	1,300,254.75
Elephant Butte storage.....	5,958.86	51,164.16	1,399,711.97	3,379,247.00
North Dakota: North Dakota pumping.....	291.55	182,949.19	17,028.57	964,890.59
Oklahoma: Lawton.....	15.00	15.00	8,536.54	8,967.19
Oregon: Umatilla.....	7,875.12	93,014.19	328,550.87	1,786,918.19
Oregon-California: Klamath.....	7.50	31,491.99	181,139.02	2,386,946.99
South Dakota: Belle Fourche.....	430.75	37,660.35	186,915.14	3,312,883.84
Utah: Strawberry Valley.....	12,848.40	45,652.27	264,124.54	2,589,511.22
Washington:				
Okanogan.....	45.30	10,304.51	89,885.59	716,072.01
Yakima Storage.....	10,271.24	29,887.46	325,999.52	1,728,447.26
Yakima-Sunnyside.....	4,105.13	74,235.35	305,650.82	2,114,747.73
Yakima-Tieton.....	31,658.13	329,087.76	64,989.60	2,923,237.26
Wyoming: Shoshone.....	3,108.77	51,622.64	156,647.11	4,068,467.01
Total.....	199,596.93	1,941,299.85	11,694,752.59	94,613,554.42

TABLE 11.—*Voucher transactions and net investments of the United States on secondary projects to June 30, 1915.*

State and project.	Debits.			
	Disbursement vouchers.		Transfers received.	
	Fiscal year 1915.	To June 30, 1915.	Fiscal year 1915.	To June 30, 1915.
Arizona:				
Little Colorado.....		\$9,515.33		\$40.00
San Carlos.....		24,589.74		252.67
San Pedro.....		2,423.72		8.97
Arizona-California:				
Colorado River.....		42,235.20		7,160.88
Colorado River Basin.....	\$50,805.63	50,838.88	\$7,348.09	7,848.09
California:				
Owens Valley.....		26,048.91		30.00
Sacramento Valley.....		52,808.13		2,748.07
San Joaquin.....		3,513.92		17.48
Iron Canyon Cooperative.....	4,164.40	15,164.42	1,481.30	4,198.30
Pit River.....	2,157.92	2,157.92	241.01	241.01
Shasta County Cooperative.....	2,135.57	2,135.57	4.88	4.88
Lassen County Cooperative.....	1,714.43	1,714.43	46.72	46.72
Colorado:				
White River.....		4,348.04		9.11
Idaho:				
Dubois.....		21,464.03		834.98
Port Neuf.....		2,165.77		2.24
General Investigations.....	147.45	496.55	695.23	695.23
King Hill.....	114.69	114.69		
Montana:				
Clark Fork.....		5,417.71		433.67
Crow Reservation.....		21,029.47		5.01
Lake Basin.....		7,044.39		79.87
Madison River.....		10,795.45		2.57
Marias.....	121.15	13,999.46		93.30
Nebraska:				
South Platte.....		1,913.96		963.05
Nebraska Investigations.....	3,110.20	3,350.94	42.76	42.76
Nevada:				
Walker River.....	900.44	13,350.92		53.15
New Mexico:				
La Plata.....		29,598.20		168.55
Las Vegas.....		5,012.16		2.23
Urtou Lake.....		19,330.65		273.71
North Dakota:				
Bismarck.....		16,709.04		26.69
Little Missouri.....		11,665.59		1,709.00
Nesson.....		7,491.51		29,786.35
Washburn.....		9,950.70		1,973.89
Bowman.....		8,649.46		1,512.97
Oklahoma:				
Cimarron.....	12,954.95	8,725.96	1,346.83	321.76
Red River.....		59,413.75		1,902.64
Oklahoma Reservation.....	400.00	400.00		
Oregon:				
Malheur.....		82,592.87		4,294.28
Central Oregon.....		43,014.03		1,749.04
Columbia River Cooperative.....	9,929.85	14,469.55	2,306.73	7,010.18
Oregon Cooperative.....	23,521.82	36,379.19	1,559.42	10,844.96
Texas:				
Pecos River investigations.....	4,635.03	6,252.93	257.42	420.74
Utah:				
Bear Lake.....		18,859.06		30.72
Utah Lake.....		34,044.67		9.25
Provo-Webber.....	141.35	141.35		
Washington:				
Benton.....		11,167.45		
Kittitas.....		19,366.90		
Wapato.....		36,445.06		20.71
Palouse.....		76,789.20		130.19
Palouse Cooperative.....	4,032.72	9,374.75	791.35	3,029.68
Priest Rapids.....		6,218.98		247.58
Wyoming:				
De Smet.....		9,053.32		2.51
Total.....	105,077.70	914,753.88	14,428.08	90,274.14

<sup>1</sup> Contra entry, due to transfer of charge to the Lawton primary project.

TABLE 11.—*Voucher transactions and net investments of the United States on secondary projects to June 30, 1915—Continued.*

State and project.	Credits.				Net investment.	
	Collection vouchers.		Transfers issued.			
	Fiscal year 1915.	To June 30, 1915.	Fiscal year 1915.	To June 30, 1915.	Fiscal year 1915.	To June 30, 1915.
Arizona:						
Little Colorado.....		\$1.00				\$9,554.33
San Carlos.....		12.90				24,829.51
San Pedro.....		.35				2,427.54
Arizona-California:						
Colorado River.....		760.32	\$4,925.26			43,710.00
Colorado River Basin.....	\$98.92	93.92	\$1,465.40	1,465.40	\$56,594.40	56,627.65
California:						
Owens Valley.....		14,016.99				12,061.92
Sacramento Valley.....		91.79		11,843.69		43,630.72
San Joaquin.....		.20				3,531.50
Iron Canyon Cooperative.....	2,614.90	9,044.43	19.50	540.96	3,011.30	8,777.33
Pit River.....					2,398.93	2,398.93
Shasta County Cooperative.....	2,100.00	2,100.00			40.45	40.45
Lassen County Cooperative.....	500.00	500.00			1,261.15	1,261.15
Colorado:						
White River.....		.15				4,357.00
Idaho:						
Dubois.....		1.81	5,068.29			17,228.91
Port Neuf.....						2,168.01
General investigations.....					842.68	1,191.78
King Hill.....					114.69	114.69
Montana:						
Clark Fork.....		.25		269.90		5,581.23
Crow Reservation.....		1.90		2,120.62		18,911.86
Lake Basin.....				21.00		7,103.26
Madison River.....		1.85		67.08		10,729.09
Marias.....		1.55		632.20	121.15	13,459.01
Nebraska:						
South Platte.....						2,877.01
Nebraska investigations.....			12.00	12.00	3,140.96	3,381.70
Nevada:						
Walker River.....					900.44	13,404.07
New Mexico:						
La Plata.....		1,702.42				28,064.33
Las Vegas.....		.30				5,014.09
Upton Lake.....		1,225.51		914.15		17,464.70
North Dakota:						
Bismarck.....		14.70	3,099.34			13,621.69
Little Missouri.....		1.25	1,439.82			11,963.52
Nesson.....		4.14	19,801.89			17,471.53
Washburn.....		42.38	1,350.68			10,531.53
Bowman.....	277.90	834.70	1,091.09		1,277.90	3,236.64
Oklahoma:						
Cimarron.....				156.55	1,3301.78	8,891.17
Red River.....		161.77		945.35		60,209.27
Oklahoma Reservation.....					400.00	400.00
Oregon:						
Malheur.....		279.80		3,116.73		83,490.62
Central Oregon.....		1,353.58		3,063.08		40,246.41
Columbia River Cooperative.....	218.12	218.12	1,688.25	4,779.90	10,850.21	16,482.01
Oregon Cooperative.....	31.33	163.55	2,616.15	6,139.54	22,433.76	40,421.06
Texas:						
Pecos River investigations.....	3.53	3.53	766.61	766.61	4,122.31	5,903.53
Utah:						
Bear Lake.....		62.06				18,827.72
Utah Lake.....		4.62				34,049.30
Provo-Webber.....					141.85	141.85
Washington:						
Benton.....	31.20	62.40			1,31.20	11,105.05
Kittitas.....						19,306.90
Wapato.....						36,465.77
Palouse.....		126.38		400.00		76,393.01
Palouse Cooperative.....	24.77	24.77	1,956.35	2,331.79	2,842.95	10,047.87
Priest Rapids.....		250.55				6,216.01
Wyoming:						
De Smet.....		39.55		98.90		8,917.38
Total.....	5,895.67	33,205.49	8,504.26	76,461.52	105,105.85	895,361.01

<sup>1</sup> Credit.

TABLE 12.—*Voucher transactions and net investment of the United States on Indian irrigation and miscellaneous to June 30, 1915.*

Item.	Debits.			
	Disbursement vouchers.		Transfers received.	
	Fiscal year 1915.	To June 30, 1915.	Fiscal year 1915.	To June 30, 1915.
Indian irrigation:				
Blackfoot project.....	\$41,895.38	\$923,993.56	\$14,338.69	\$109,270.79
Flathead project.....	128,353.27	1,514,261.08	5,738.51	84,574.36
Fort Peck project.....	66,225.61	437,442.11	2,352.11	40,735.22
Total.....	236,474.26	2,875,696.70	22,429.31	234,580.28
Miscellaneous:				
General expense.....	374,992.14	2,818,237.97	10,646.38	119,271.27
Preliminary investigations.....				80,488.73
Jackson Lake enlargement.....	399,220.05	542,823.11	21,278.32	93,845.47
Total.....	774,212.19	3,360,561.08	31,924.70	293,605.47

Item.	Credits.				Net investment.	
	Collection vouchers.		Transfers issued.			
	Fiscal year 1915.	To June 30, 1915.	Fiscal year 1915.	To June 30, 1915.	Fiscal year 1915.	To June 30, 1915.
Indian irrigation:						
Blackfoot project.....	\$101,660.67	\$950,762.62	\$18,602.23	\$83,489.49	\$64,028.83	\$967.85
Flathead project.....	239,185.77	1,544,338.11	22,797.21	46,509.78	127,891.20	7,987.50
Fort Peck project.....	128,981.18	463,558.43	3,575.89	16,188.60	163,979.35	11,569.70
Total.....	469,827.62	2,958,659.16	44,975.33	146,187.87	255,899.38	5,429.95
Miscellaneous:						
General expense.....	6,639.14	30,865.58	360,780.82	2,840,545.33	18,218.56	66,098.33
Preliminary investigations.....						80,488.73
Jackson Lake enlargement.....	177,209.87	579,112.30	1,800.24	2,264.80	241,488.26	54,791.48
Total.....	183,849.01	609,977.88	362,581.06	2,842,810.13	259,706.82	201,378.54

<sup>1</sup> Credit balances due to transfer of appropriation in advance of performing work.

A recapitulation of Tables 10, 11, and 12 follows:

TABLE 13.—*Recapitulation and verification of voucher transactions and all net investments of the United States from the reclamation fund to June 30, 1915.*

Item.	Debits.			
	Disbursement vouchers.		Transfers received.	
	Fiscal year 1915.	To June 30, 1915.	Fiscal year 1915.	To June 30, 1915.
Primary projects.....	\$13,097,406.75	\$103,944,688.85	\$546,875.49	\$4,388,299.48
Secondary projects.....	105,077.70	914,753.88	14,428.08	90,274.14
Indian irrigation.....	236,474.26	2,875,696.70	22,429.31	234,580.28
Miscellaneous.....	774,212.19	3,360,561.08	31,924.70	293,605.47
Total.....	14,213,172.90	111,095,700.51	615,657.58	5,006,759.37

TABLE 13.—*Recapitulation and verification of voucher transactions and all net investments of the United States from the reclamation fund to June 30, 1915—Continued.*

Item.	Credits.			
	Collection vouchers.			
	Miscellaneous.		Water-right charges.	
	Fiscal year 1915.	To June 30, 1915.	Fiscal year 1915.	To June 30, 1915.
Primary projects.....	\$1,105,390.18	\$6,135,410.09	\$644,544.54	\$5,642,723.97
Secondary projects.....	5,895.67	33,205.49		
Indian irrigation.....	469,827.62	2,958,659.16		
Miscellaneous.....	183,849.01	609,977.88		
Total.....	1,764,962.48	9,737,252.62	644,544.54	5,642,723.97

Item.	Credits.		Net investment.	
	Transfers issued.			
	Fiscal year 1915.	To June 30, 1915.	Fiscal year 1915.	To June 30, 1915.
Primary projects.....	\$199,596.93	\$1,941,299.85	\$11,604,752.59	\$94,613,554.42
Secondary projects.....	8,504.26	76,461.52	105,105.85	895,361.01
Indian irrigation.....	44,975.33	146,187.87	<sup>1</sup> 255,809.38	5,429.95
Miscellaneous.....	362,581.06	2,842,810.13	259,706.82	201,378.54
Total.....	615,657.58	5,006,759.37	11,808,665.88	95,715,723.92

<sup>1</sup> Credit balances due to transfer of appropriation in advance of performing work.

## COLLECTIONS.

The two tables below give information as to collections that have been made under the reclamation operations. Table 14 gives an analysis of the sources of all cash collections to June 30, 1915, while Table 15 gives, by projects, the amount collected for water-right charges.

TABLE 14.—*Analysis of cash collections by fiscal years to June 30, 1915.*

Sources.	Fiscal years 1903-1914.	Fiscal year 1915.	Total.
Miscellaneous sales.....	\$1,343,272.12	\$383,342.20	\$1,726,614.32
Miscellaneous services.....	3,552,106.38	585,691.08	4,137,797.46
Temporary water rentals.....	2,204,723.43	502,805.65	2,707,529.08
Transportation refunds.....	260,464.86	31,215.59	291,680.45
Forfeitures by bidders and contractors.....	78,588.71	100.00	78,688.71
Power and light.....	499,104.01	280,614.45	779,718.46
Water-right construction charges.....	3,102,331.59	473,137.31	3,575,468.90
Water-right operation and maintenance charges.....	1,895,847.84	171,407.23	2,067,255.07
Overdisbursements.....	34,030.63	1,193.51	35,224.14
Total.....	12,970,469.57	2,409,507.02	15,379,976.59

TABLE 15.—Collection of water-right charges by projects to June 30, 1915.

State and project.	Construction charges.		Operation and maintenance charges.		Total.	
	Fiscal year 1915.	To June 30, 1915.	Fiscal year 1915.	To June 30, 1915.	Fiscal year 1915.	To June 30, 1915.
Arizona: Salt River.....		\$100,000.00				\$100,000.00
Arizona-California: Yuma.....	\$72,479.43	215,901.69		\$44,345.55	\$72,479.43	260,247.24
Idaho: Minidoka.....	23,657.48	398,456.51	\$24,728.95	259,209.60	48,386.43	657,666.11
Kansas: Garden City.....		142.50		104.50		247.00
Montana:						
Huntley.....	14,819.45	255,681.82	14,122.84	95,756.22	28,942.29	351,438.04
Sun River.....	17,791.60	110,166.95	2,648.25	26,851.16	20,439.85	147,018.11
Montana-North Dakota:						
Lower Yellowstone.....	1,117.52	84,948.07	358.06	36,144.49	1,470.57	71,092.56
Nebraska-Wyoming: North Platte.....	53,526.51	237,121.61	22,706.13	274,142.49	76,232.64	511,264.10
Nevada: Truckee-Carson.....	29,044.63	264,335.17	21,431.40	157,653.14	50,476.03	421,988.31
New Mexico: Carlsbad.....	8,552.81	119,332.11	11,734.58	124,334.47	20,287.39	243,666.58
North Dakota: North Dakota Pumping.....	1,165.39	7,847.52	840.35	13,307.15	1,505.74	21,154.67
Oregon: Umatilla.....	8,725.10	196,112.26	6,364.16	65,096.61	15,089.26	261,208.87
Oregon-California: Klamath.....	11,014.88	277,705.88	1,679.02	110,624.25	12,693.90	388,330.13
South Dakota: Belle Fourche.....	25,508.64	133,622.50	15,733.19	106,837.06	41,241.83	240,456.56
Washington:						
Okanogan.....	77.63	24,549.33		35,492.62	77.63	60,041.95
Yakima storage.....	100,000.00	100,000.00			100,000.00	100,000.00
Sunnyside.....	41,195.76	633,530.91	34,961.69	477,296.88	76,157.45	1,110,827.79
Tieton.....	34,395.06	225,484.81	1,445.89	124,939.68	35,840.95	350,424.49
Wyoming: Shoshone.....	30,065.42	240,529.26	13,157.73	105,119.20	43,223.15	345,648.46
Total.....	473,137.31	3,575,468.90	171,407.23	2,067,255.07	644,544.54	5,642,723.97

State and project.	Refunds.						Net collection of water-right charges to June 30, 1915.
	Construction charges.		Operation and maintenance charges.		Total.		
	Fiscal year 1915.	To June 30, 1915.	Fiscal year 1915.	To June 30, 1915.	Fiscal year 1915.	To June 30, 1915.	
Arizona: Salt River.....							\$100,000.00
Arizona-California: Yuma.....							260,247.24
Idaho: Minidoka.....		\$234.10		\$18.00		\$252.10	657,414.01
Kansas: Garden City.....		142.50		104.50		247.00	
Montana:							
Huntley.....	\$268.50	603.39	\$30.00	96.97	\$298.50	700.36	350,787.68
Sun River.....		755.85		125.97		881.82	146,136.29
Montana-North Dakota:							
Lower Yellowstone.....							71,092.56
Nebraska-Wyoming: North Platte.....	107.60	229.60		24.40	107.60	254.00	511,010.10
Nevada: Truckee-Carson.....		210.00		42.00		252.00	421,736.31
New Mexico: Carlsbad.....							243,666.58
North Dakota: North Dakota Pumping.....		129.20		23.80		153.00	21,001.67
Oregon: Umatilla.....		63.00		9.55		72.55	261,136.32
Oregon-California: Klamath.....		186.00		18.00		204.00	388,126.13
South Dakota: Belle Fourche.....	260.00	260.00	5.87	5.87	265.87	265.87	240,193.69
Washington:							
Okanogan.....				52.50		52.50	59,989.45
Yakima storage.....							100,000.00
Sunnyside.....		1,874.60		542.45		2,417.05	1,108,410.74
Tieton.....		762.60				762.60	349,661.89
Wyoming: Shoshone.....		1,187.52		257.02		1,444.54	344,203.92
Total.....	636.10	6,638.36	35.87	1,321.08	671.97	7,959.39	5,634,764.58

**RIO GRANDE DAM APPROPRIATION.**

The three tables that follow give for the Rio Grande Dam appropriation information similar to that appearing in Tables 5 to 8, inclusive, with corresponding titles for the reclamation fund:

**TABLE 16.**—*Special appropriation for Rio Grande (Engle) Dam (34 Stat., 1357) to June 30, 1915.*

	Debit.	Credit.
Appropriation warrant No. 79, Mar. 4, 1907.....		\$1,000,000.00
Disbursements, 2,896 vouchers.....	\$1,000,091.78	
Collections, 24 vouchers.....		91.78
<b>Total.....</b>	<b>1,000,091.78</b>	<b>1,000,091.78</b>

**TABLE 17.**—*Balances of appropriations for Rio Grande (Engle) Dam with Treasurer of the United States, June 30, 1907, to June 30, 1915.*

Fiscal year.	Appropriation.	Withdrawals.	Balances.
1907.....	\$1,000,000.00		\$1,000,000.00
1908.....		\$33,113.21	966,886.79
1909.....		137,074.23	829,812.57
1910.....		247,217.23	582,595.34
1911.....		327,875.96	254,719.38
1912.....		214,062.49	40,656.89
1913.....		39,165.89	1,501.00
1914.....		1,501.00	
<b>Total.....</b>	<b>1,000,000.00</b>	<b>1,000,000.00</b>	

**TABLE 18.**—*Disbursement and collection vouchers, appropriation for Rio Grande (Engle) Dam, paid and collected to June 30, 1915.*

Fiscal year.	Disbursement vouchers.		Collection vouchers.	
	Number.	Amount.	Number.	Amount.
Balance from Twelfth Annual Report.....	2,896	\$908,590.78	24	\$91.78
June 30, 1914.....	1	1,501.00		
<b>Total.....</b>	<b>2,896</b>	<b>1,000,091.78</b>	<b>24</b>	<b>91.78</b>

**RECLAMATION DEPOSIT ACCOUNT.**

Below is a statement of receipts, payments, and balances to June 30, 1915. A description of the nature of the account appears on page 51 of the tenth annual report.

**TABLE 19.**—*Receipts and payments from reclamation deposit account during fiscal year 1915.*

Dates.	Receipts.	Payments.	Balance.
Balance on hand—			
June 30, 1914.....	\$53,777.29		\$53,777.29
July, 1914.....	214,360.82	\$175,308.50	\$82,829.61
August, 1914.....	115,155.41	81,501.28	126,484.74
September, 1914.....	7,443.29	81,352.15	52,575.88
October, 1914.....	34,451.40	39,619.35	47,407.93
November, 1914.....	23,782.83	9,550.22	61,640.54
December, 1914.....	139,783.91	171,178.89	30,245.55
January, 1915.....	85,056.71	19,908.88	95,398.39
February, 1915.....	45,744.21	72,821.05	69,316.52
March, 1915.....	55,729.04	75,778.51	49,267.05
April, 1915.....	182,206.13	42,530.92	185,942.26
May, 1915.....	226,102.10	200,308.39	214,735.97
June, 1915.....	68,301.47	49,863.91	233,173.53
<b>Total.....</b>	<b>1,262,895.61</b>	<b>1,019,722.08</b>	<b>233,173.53</b>

## FINANCIAL STATEMENTS.

TABLE 20.—*Assets, liabilities, reserves, and capital, Washington and detached offices, to June 30, 1915.*

ASSETS.	
Cash in fiscal agent's possession awaiting remittance.....	\$51. 42
Accounts receivable, uncollected miscellaneous items.....	3, 228. 95
Inventories:	
Mechanical and other equipment.....	\$40, 862. 20
Material and supplies on hand in storehouse.....	43, 396. 32
Undistributed cost (freight and handling).....	3, 141. 74
	<hr/> 87, 400. 26
Construction work in process:	
Undistributed expenses to date.....	16, 545. 53
Less revenue earned as follows—	
Rental of telephones.....	\$401. 29
Revenues, miscellaneous.....	2, 091. 69
Adjustments, depreciation on plant and equipment.....	8, 333. 52
	<hr/> 10, 826. 50
Net expenditures undistributed to projects.....	5, 719. 03
Total assets.....	<hr/> <hr/> 96, 399. 66
LIABILITIES, RESERVES, AND CAPITAL.	
Accounts payable:	
Unpaid labor.....	\$3, 515. 30
Unpaid purchases.....	8, 872. 04
Unpaid freight and express charges.....	150. 49
Unpaid passenger fares.....	15, 841. 34
Unpaid miscellaneous.....	1, 922. 16
	<hr/> 30, 301. 33
Net investment:	
Disbursements.....	\$2, 818, 237. 97
Transfers received from other projects....	119, 271. 27
	<hr/> 2, 937, 509. 24
Less—	
Collections.....	30, 865. 58
Transfers issued to other projects....	2, 840, 545. 33
	<hr/> 2, 871, 410. 91
	<hr/> 66, 098. 33
Total liabilities, reserves, and capital investment of the Government.....	<hr/> <hr/> 96, 399. 66
<i>Undistributed expenses of Washington office and detached offices to June 30, 1915.</i>	
Balance of cost ledger to June 30, 1915.....	\$15, 802. 98
Stores and other operations (inventories).....	742. 55
Gross undistributed cost to date.....	<hr/> 16, 545. 53
<i>Estimated expenditures of Washington office and detached offices for the fiscal year 1916.</i>	
Salaries.....	\$289, 445. 00
Per diem and traveling expenses.....	16, 000. 00
Passenger transportation.....	23, 720. 00
Equipment (furniture and fixtures, etc.).....	5, 650. 00
Storehouse supplies for issue to projects.....	51, 163. 00
Storehouse supplies for local use.....	18, 597. 00
Rental of offices.....	13, 580. 00
Telephone and telegraph service.....	7, 571. 00
Heat, light, and power.....	1, 500. 00
Miscellaneous.....	271. 00
Total.....	<hr/> 425, 497. 00



TABLE 21.—*Assets, liabilities, reserves, and capital, secondary projects, to June 30, 1915.*

Accounts receivable, uncollected miscellaneous.....		\$664. 53
Inventories, mechanical and other equipment.....		9, 842. 21
Construction work in process:		
Gross preliminary expenses of projects to date.....	\$972, 446. 36	
Plus loss on mess-house operation.....	\$1, 495. 28	
Less rental of grazing lands.....	<sup>1</sup> 62. 40	
Profits on hospitals.....	<sup>1</sup> 3. 25	
Advance payment on account of cooperative work.....	<sup>1</sup> 219. 87	
Net increase.....		1, 209. 76
Net preliminary expenses of projects to date.....		973, 656. 12
Total assets.....		<u>984, 162. 86</u>
LIABILITIES, RESERVES, AND CAPITAL.		
Accounts payable:		
Unpaid labor.....	\$5, 288. 04	
Unpaid purchases.....	1, 073. 50	
Unpaid freight and express charges.....	405. 53	
Unpaid passenger fares.....	662. 80	
Unpaid miscellaneous.....	883. 25	
		8, 313. 12
Net investment:		
Disbursements.....	\$914, 753. 88	
Transfers received from other projects....	170, 762. 87	
		1, 085, 516. 75
Less—		
Collections.....	33, 205. 49	
Transfers issued to other projects.....	76, 461. 52	
		109, 667. 01
Total.....		<u>975, 849. 74</u>
Total liabilities, reserves, and capital investment of the Government.....		<u>984, 162. 86</u>

*Cost of secondary projects for fiscal year 1915 and total to June 30, 1915.*

[Miscellaneous preliminary investigations.]

State and project.	Fiscal year 1915.	To June, 30, 1915.
Arizona:		
Little Colorado.....		39, 554. 23
San Carlos.....		24, 829. 51
San Pedro.....		2, 427. 34
Arizona-California:		
Colorado River.....		43, 710. 00
Colorado River Basin.....	\$51, 170. 43	51, 203. 68
California:		
Owens Valley.....		12, 061. 92
Sacramento Valley.....		43, 620. 72
San Joaquin.....		3, 531. 20
Iron Canyon Cooperative.....	2, 813. 76	9, 464. 07
Pit River.....	2, 463. 93	2, 463. 93
Shasta County Cooperative.....	1, 880. 14	1, 880. 14
Lassen County Cooperative.....	1, 061. 28	1, 061. 28
Colorado:		
White River.....		4, 357. 00
Idaho:		
Dubois.....		17, 228. 91
Fort Neuf.....		2, 168. 01
General investigations.....	842. 68	1, 191. 78
King Hill.....	114. 94	114. 94
Montana:		
Clark Fork.....		5, 581. 23
Crow Reservation.....		13, 911. 96
Lake Basin.....		7, 108. 26
Madison River.....		10, 729. 09
Marías.....		13, 469. 04
	121. 15	

<sup>1</sup> Deduct.

*Cost of secondary projects for fiscal year 1915 and total to June 30, 1915—Continued.*

State and project.	Fiscal year 1915.	To June 30, 1915.
<b>Nebraska:</b>		
South Platte.....		\$2,877.01
Nebraska investigations.....	\$3,140.96	3,331.70
<b>Nevada:</b>		
Walker River.....	900.44	13,404.07
<b>New Mexico:</b>		
La Plata.....		28,064.33
Las Vegas.....		5,014.09
Urton Lake.....		17,464.70
<b>North Dakota:</b>		
Bismarck.....		13,621.69
Little Missouri.....		11,933.52
Nesson.....		17,471.83
Washburn.....		10,531.53
Bowman.....	1 277.90	3,236.64
<b>Oklahoma:</b>		
Cimarron.....	1 3,301.78	8,891.17
Red River.....		60,209.27
Oklahoma reconnaissance.....	400.00	400.00
<b>Oregon:</b>		
Malheur.....		83,490.62
Central Oregon.....		40,346.41
Columbia River power.....	10,611.83	16,448.51
Oregon Cooperative.....	26,251.19	40,488.83
<b>Texas:</b>		
Pecos River.....	3,361.58	6,421.67
<b>Utah:</b>		
Bear Lake.....		18,827.72
Provo-Webber.....	141.35	141.35
Utah Lake.....		34,049.30
<b>Washington:</b>		
Benton.....		11,167.45
Kittitas.....		19,366.90
Wapato.....		36,465.77
Palouse.....		76,393.01
Palouse Cooperative.....	3,481.42	10,066.84
Priest Rapids.....		6,216.01
<b>Wyoming:</b>		
De Smet.....		8,917.38
Miscellaneous preliminary investigations.....		30,488.73
<b>Total.....</b>	<b>105,172.40</b>	<b>972,446.36</b>

<sup>1</sup> Credit.

*Estimated cost of contemplated work on secondary projects during fiscal year 1916.*

<b>Arizona-California-Wyoming, Colorado River investigations:</b>	
Colorado River Basin (including \$2,500 allotted for cooperative work with State of Wyoming).....	\$15,000
Lower Colorado River.....	12,000
Water right investigations.....	8,335
Gaging streams on Colorado River and tributaries.....	2,400
<b>California:</b>	
Iron Canyon Cooperative investigations.....	25
Lassen County Cooperative investigations.....	308
Pit River investigations.....	55
Shasta County Cooperative investigations.....	942
Montana: Marias.....	100
Nevada: Walker River investigations.....	50
<b>Oregon:</b>	
Columbia River power investigations.....	25
Oregon Cooperative work.....	7,500
<b>Texas: Pecos River investigations.....</b>	<b>900</b>
<b>Wyoming: Investigation of pumping projects.....</b>	<b>2,360</b>
<b>Total.....</b>	<b>50,000</b>

## RECLAMATION ORGANIZATION.

### ADMINISTRATIVE ORGANIZATION OF THE SERVICE.

The following order was issued by the Secretary of the Interior on May 6, 1915:

Effective June 1, 1915, and until further orders the following offices and organization shall be maintained for the administration of the United States Reclamation Service:

#### OFFICES.

1. *Washington, D. C., office.*—An office will be maintained in Washington as the headquarters of an organization to be known as the Reclamation Service and to be composed of the director and chief engineer (as chairman), the chief counsel, and the comptroller. These officers shall determine matters of general policy and recommend appropriate action thereon to the Secretary of the Interior; but no action of the members individually or collectively shall become effective unless the same is in pursuance of authority previously given by the Secretary of the Interior.

2. *Denver, Colo., office.*—An executive office shall be established at Denver, in charge of the chief of construction, and all matters relating to the management and execution of the work in the field shall pass through said office. It is my desire that in so far as practicable all detached offices excepting that of the supervisor of irrigation shall be incorporated with the Denver office, also that departments for purchasing, disbursing, and the administrative examination of accounts shall be established in this office, and it is hereby directed that the concentration shall be accomplished as rapidly as the conditions of the service will permit.

3. *Project offices.*—Local offices will be maintained on each project, in charge of a project manager or engineer, who shall control all of the employees engaged in the construction or operation of their respective projects and will be held strictly responsible for the economical and efficient administration of the project offices.

#### DIVISIONS.

4. *Executive and engineering.*—The director and chief engineer shall be the executive officer of the service and shall govern and control all employees engaged in investigating, constructing, operating, and maintaining projects. He shall issue all instructions required to carry out approved policies and for executing the necessary work, through the executive office at Denver. The chief of construction shall represent the executive officer in the field and shall have charge of the Denver office and all employees engaged in the construction, operation, and maintenance of the projects and works incident thereto. He shall report to the director and chief engineer and, subject to the latter's general approval, shall adopt the measures necessary to execute the approved plans and policies.

Project managers or engineers will report direct to the chief of construction at Denver, as will all detached officers prior to the proposed consolidation.

5. *Legal division.*—The chief counsel, as the head of the legal division, shall conduct all investigations involving the legal rights and privileges of the service, and will control all employees of his division. He will correspond direct with the district counsel in regard to legal affairs, but shall communicate with the executive department through the chief engineer and regular channels.

6. *Fiscal division.*—The comptroller, as the head of the fiscal division, shall conduct the examination and auditing of all accounts. For this purpose he shall organize and control an ample force of inspectors, auditors, and accountants to insure the thorough inspection and audit of the accounts kept in all offices of the service, and to collect and compile the information as to fiscal affairs required by the Secretary of the Interior and the service. The force under his control may be divided between the Washington and Denver offices, as may be considered for the best interests of the service. The inspectors shall advise and direct the field offices as to routine methods of complying with approved regulations only, and shall promptly report all irregularities to the comptroller, who will advise the executive officer, and the latter shall rectify the matter through regular channels.

7. *Supervisor of irrigation.*—The supervisor of irrigation shall maintain an office at Billings, Mont., and shall advise and counsel with water users as to the best practice of irrigating and cultivating irrigated lands, the development of markets, and all questions affecting the welfare of settlers and water users. He shall consult and cooperate with the experts of the Agricultural Department that are assigned to the projects, and advise the executive officer of the Reclamation Service regarding all irregularities in the operating departments of the respective projects that may come to his notice through inspection or otherwise.

FRANKLIN K. LANE.

### GENERAL OFFICERS.

Hon. Franklin Knight Lane, Secretary of the Interior.

Brig. Gen. William L. Marshall, United States Army, retired, consulting engineer to the Secretary.

The following three officials of the Reclamation Service constitute a board or commission for the purpose of considering all questions of administrative policy and management, and recommending action thereon to the Secretary of the Interior:

Arthur Powell Davis, director and chief engineer, Washington, D. C.

Will R. King, chief counsel, Washington, D. C.

W. A. Ryan, comptroller, Washington, D. C.

### WASHINGTON OFFICE.

Office of the director and chief engineer: C. J. Blanchard, statistician; Frank Teichman, E. C. Bebb, and L. W. Hall, engineers; John H. Pellen, draftsman.

Office of the chief counsel: Law section: H. L. Holgate, assistant chief counsel, E. B. Hoffman, C. A. Mansuy, G. A. Ward, and J. L. Clancy. Land and general section—Morris Bien, counsel, J. M. McKinney, O. G. Cowhick, D. H. Sibbett, J. E. Golladay, Mrs. G. B. Mathiot, J. J. Fuller, Mrs. E. W. Ballard.

Office of the comptroller: H. P. Seidemann, chief accountant; C. G. Smith, examiner of accounts; E. G. Paul, chief clerk; A. H. Shellenberger, special fiscal agent.

### DENVER OFFICE.

Sydney B. Williamson, chief of construction, Tramway Building, Denver, Colo.; E. H. Baldwin, assistant chief of construction; J. M. Gaylord, electrical engineer; E. H. Peery, O. P. Morton, and E. E. Roddis, district counsel; D. W. Murphy, engineer in charge of drainage; E. A. Moritz, office engineer; J. Y. Jewett, cement expert; Arthur L. Boyd, purchasing agent; William M. McCoy, chief accountant; C. G. Duganne, disbursing officer; John C. Keller, chief clerk; I. C. Harris, engineer in charge of inspection of materials, 802 Federal Building, Chicago, Ill.

### OFFICE OF THE SUPERVISOR OF IRRIGATION.

I. D. O'Donnell, supervisor of irrigation, 206 State Bank Building, Billings, Mont.; Robert C. Elting, chief clerk.

### SOUTHERN DIVISION.

#### ARIZONA, CALIFORNIA, COLORADO, NEW MEXICO, TEXAS.

E. E. Roddis, district counsel for Salt River and Yuma projects, Denver, Colo.; P. W. Dent, district counsel for Rio Grande, Carlsbad, and Hondo projects, El Paso, Tex.; J. J. Buck, assistant district counsel.

*Salt River project.*—W. S. Cone, project manager, Phoenix, Ariz.; Walter Ward, engineer; A. J. Haltom, assistant engineer.

*Yuma project.*—L. M. Lawson, project manager, Yuma, Ariz.; R. M. Priest, superintendent of construction; A. N. Kelley, irrigation manager; J. R. Stilson, chief clerk.

*Rio Grande project.*—R. F. Walter, project manager, El Paso, Tex.; H. J. Gault and J. D. Stannard, engineers; Oro McDermit, irrigation manager; J. M. Luney, chief clerk.

*Elephant Butte Dam.*—L. J. Charles, acting construction engineer, Elephant Butte, N. Mex.; A. McD. Brooks, chief clerk.

*Carlsbad and Hondo projects.*—L. E. Foster, project manager, Carlsbad, N. Mex.; C. A. May, assistant project manager; V. L. Minter, chief clerk.

**PACIFIC DIVISION.****CALIFORNIA, NEVADA, OREGON.**

E. S. Taylor, district counsel, 417 Fenton Building, Portland, Oreg.

*Orland project.*—A. N. Burch, project manager, Orland, Cal.; C. H. Lillington, chief clerk.

*Truckee-Carson project.*—D. W. Cole, project manager, Fallon, Nev.; F. G. Hough, assistant manager; J. R. Post, chief clerk. Lahontan Dam: F. H. Tillinghast, engineer, Lahontan, Nev.; H. N. Bickel, principal clerk.

*Umatilla project.*—H. D. Newell, project manager, Hermiston, Oreg.; Maurice Scroggs, superintendent of irrigation, C. W. Kellogg, chief clerk.

*Klamath project.*—J. G. Camp, project manager, Klamath Falls, Oreg.; C. C. Hogue, chief clerk.

*Cooperative work in Oregon and California.*—John T. Whistler, engineer in charge, 215 Central Building, Portland, Oreg.; Garfield Stubblefield, engineer, 202 Central Building, Portland, Oreg.; Harry Caden, chief clerk.

**NORTHERN DIVISION.****MONTANA, NORTH DAKOTA, WYOMING.**

W. J. Egleston, district counsel, Great Falls, Mont.

*Blackfoot project.*—J. B. Bond, project manager, Browning, Mont.; J. W. Krieger, chief clerk.

*Flathead project.*—E. F. Tabor, project manager, St. Ignatius, Mont.; S. G. Swigart, irrigation manager.

*Fort Peck project.*—R. M. Conner, project manager, Poplar, Mont.; Frank Nivens, chief clerk.

*Huntley project.*—R. H. Fifield, project manager, Huntley, Mont.; E. B. Le Claire, chief clerk.

*Milk River project.*—W. W. Schlecht, project manager, Malta, Mont.; G. E. Stratton, engineer, Glasgow, Mont.; Frank Nivens, chief clerk, Malta, Mont.

*St. Mary storage unit.*—Joseph Wright, engineer, Babb, Mont.; L. V. Branch, engineer; J. W. Krieger, chief clerk, Browning, Mont.

*Sun River project.*—C. P. Williams, project manager, Fort Shaw, Mont.; Augustine H. Ayers, engineer; O. A. Peavey, chief clerk.

*North Dakota pumping project.*—W. S. Arthur, acting project manager, Williston, N. Dak.

*Lower Yellowstone project.*—L. H. Mitchell, project manager, Savage, Mont.; C. H. Young, chief clerk.

*Shoshone project.*—G. O. Sanford, project manager, Powell, Wyo.; C. M. Jump, superintendent of irrigation; C. E. Piatt, chief clerk.

**ROCKY MOUNTAIN DIVISION.****COLORADO, KANSAS, NEBRASKA, OKLAHOMA, SOUTH DAKOTA, WYOMING.**

A. R. Honnold, district counsel, Scottsbluff, Nebr.; J. R. Alexander, district counsel, Montrose, Colo.

*Grand Valley project.*—J. H. Miner, project manager, Grand Junction, Colo.; E. R. Mills, chief clerk.

*Uncompahgre Valley project.*—F. D. Pyle, project manager, Montrose, Colo.; J. H. Fertig, assistant engineer; L. J. Mead, chief clerk.

*North Platte project.*—Andrew Weiss, project manager, Mitchell, Nebr.; Paul Rothi, irrigation manager; O. T. Reedy, engineer; O. P. Burrows, chief clerk.

*Pathfinder Dam.*—R. B. Diemer, junior engineer, Mitchell, Nebr.

*Belle Fourche project.*—B. E. Hayden, project manager, Newell, S. Dak.; R. B. Smith, chief clerk.

*Lawton project.*—P. M. Fogg, project manager, Lawton, Okla.

## CENTRAL DIVISION.

ARIZONA, COLORADO, IDAHO, NEVADA, NEW MEXICO, OREGON, UTAH, WYOMING.

B. E. Stoutemeyer, district counsel, Boise, Idaho; R. M. Patrick, district counsel, Forrest Stuart, assistant district counsel, Provo, Utah.

*Boise project (distribution unit).*—F. E. Weymouth, project manager, Boise, Idaho; George E. Moore, chief clerk.

*Boise River storage unit.*—C. H. Paul, construction engineer, Arrowrock, Idaho; James Munn, superintendent of construction.

*Minidoka project.*—H. M. Schilling, project manager, Rupert, Idaho; F. N. Cronholm, superintendent of construction.

*Minidoka power and pumping stations.*—Barry Dibble, engineer, Minidoka, Idaho.

*Jackson Lake enlargement project.*—F. A. Banks, engineer, Moran, Wyo.; F. T. Crowe, engineer; S. R. Wilson, chief clerk.

*Strawberry Valley project.*—J. L. Lytel, project manager, Provo, Utah; J. L. Segall, chief clerk.

*Colorado River storage.*—J. F. Richardson, engineer, Green River, Wyo.

## WASHINGTON DIVISION.

IDAHO, WASHINGTON.

E. W. Burr, district counsel; N. K. Buck (per diem basis), assistant district counsel, North Yakima, Wash.

*Okanogan project.*—Calvin Casteel, project manager, Okanogan, Wash.; H. A. Yates, chief clerk.

*Yakima project (storage unit).*—C. E. Crownover, project manager, Meadow Creek, Wash.; R. R. Ruhnke, chief clerk.

*Yakima project (Sunnyside and Trieton units).*—R. K. Tiffany, project manager, North Yakima, Wash.; R. K. Cunningham, chief clerk; J. G. Heinz, assistant manager, Sunnyside, Wash.; J. S. Moore, assistant engineer; C. F. Gleason, assistant engineer (pumping plant construction); G. C. Finley, superintendent of irrigation, Naches, Wash.

## DISTRIBUTION OF EMPLOYEES.

*Employees, June, 1915.<sup>1</sup>*

Office or project.	Educa- tional.	Non- educa- tional.	Others.	Total United States.	Con- trac- tors.	Grand total.	
						Proj- ects.	Divi- sion.
Washington office <sup>2</sup> .....	92	7	.....	99	.....	99	163
Denver office.....	27	.....	.....	27	.....	27	
Billings office.....	2	.....	.....	2	.....	2	
Chicago office.....	17	.....	.....	17	.....	17	
Los Angeles office.....	12	.....	.....	12	.....	12	
Denver (cement) office.....	2	4	.....	6	.....	6	
Southern division office.....	6	.....	.....	6	.....	6	2,396
Salt River project.....	30	150	450	630	.....	630	
Yuma project.....	11	74	414	499	.....	499	
Carlsbad project.....	3	10	141	154	9	163	
Hondo project.....	.....	1	2	3	.....	3	
Rio Grande project (distribution).....	21	67	425	513	.....	513	
Elephant Butte storage.....	16	56	500	572	.....	572	2,396
Pacific division office.....	6	.....	.....	6	.....	6	
Orland.....	6	12	104	122	.....	122	
Truckee-Carson.....	12	29	129	170	.....	170	
Umatilla.....	11	31	238	280	15	295	
Klamath.....	5	21	156	182	.....	182	
California cooperative.....	1	2	1	4	.....	4	795
Oregon cooperative.....	4	4	8	16	.....	16	
Northern division office.....	8	1	.....	9	.....	9	
Blackfeet (Indian).....	1	.....	5	6	.....	6	
Flathead (Indian).....	9	23	33	65	40	105	
Fort Peck (Indian).....	2	1	2	5	.....	5	
Huntley.....	9	19	124	152	.....	152	1,788
Milk River.....	19	11	20	50	160	210	
St. Mary storage.....	16	38	334	388	215	603	
Sun River.....	23	22	25	70	446	516	
Lower Yellowstone.....	5	10	15	30	.....	30	
North Dakota pumping.....	2	5	9	16	.....	16	
Shoshone.....	12	33	91	136	.....	136	1,232
Rocky Mountain division office.....	4	.....	.....	4	.....	4	
Grand Valley.....	14	42	234	290	215	505	
Uncompahgre Valley.....	14	65	140	219	.....	219	
Garden City.....	.....	.....	1	1	.....	1	
North Platte.....	14	94	109	217	118	335	
Lawton.....	1	3	.....	4	.....	4	1,232
Belle Fourche.....	8	35	107	150	14	164	
Central division office.....	5	3	1	9	.....	9	
Boise (distribution unit).....	37	275	575	887	.....	887	
Boise (storage), Arrowrock.....	6	104	290	390	.....	390	
Minkdoka.....	18	140	170	328	.....	328	3,044
Jackson Lake enlargement.....	8	61	133	202	.....	202	
Strawberry Valley.....	15	60	218	293	900	1,193	
Colorado River storage.....	1	8	26	35	.....	35	
Washington division office.....	6	1	.....	7	.....	7	1,112
Okanogan.....	4	8	20	32	.....	32	
Yakima project office.....	6	.....	.....	6	.....	6	
Storage unit.....	12	121	495	628	.....	628	
Sunnyside unit.....	12	69	300	381	15	396	
Tieton unit.....	5	18	20	43	.....	43	
Grand total, June, 1915.....	580	1,738	6,055	8,373	2,147	10,520	
Grand total, June, 1914.....	541	1,553	6,076	8,170	1,058	9,228	
Increase, 1915.....	39	185	-21	203	1,089	1,292	

<sup>1</sup> See p. 425, average and maximum, January to June, 1915.<sup>2</sup> Exclusive of eight consulting engineers employed at intervals.

Statement of injuries to employees of the United States Reclamation Service reported under the act of May 30, 1908.

Project.	Injuries reported.					Claims allowed.					Compensation paid.*					Total.
	1908	1909	1910	1911	1912	1913	1914	1908	1909	1910	1911	1912	1913	1914*		
Salt River.....	9	15	9	11	7	13	12	482,322.25	\$4,138.00	\$4,397.01	\$1,919.25	\$788.00	\$83,267.00	\$999,238.91	17,570.76	
Yuma.....	18	1	43	46	51	18	19	2,180.80	191.38	2,711.84	2,424.83	10,740.79	1,691.55	2,775.26	22,616.55	
Orland.....	1	1	1	1	2	3	3	78.00	1,378.81		306.48	172.63	48.40	43.00	2,082.92	
Klamath.....																
Grand Valley.....	3	40	28	11	8	44	113	30.00	5,462.24	11,698.45	1,468.79	177.92	2,398.72	7,553.62	10,130.26	
Uncompahgre.....																
Minidoka.....	7	10	6	7	4	9	9	854.85	2,588.25	253.75	1,066.79	1,333.92	562.69	20,618.43		
Boise.....	6	11	66	118	94	190	137	991.63	847.13	2,403.96	17,085.09	14,338.82	467.86	6,770.41		
Snake River storage.....	1	11	16				11	859.50	1,629.18		280.28		20,955.01	56,271.34		
Garden City.....	3	3	3	3	2	3	2	77.46					730.44	1,224.95	4,714.45	
Blackfoot (Indian).....	5	5	3	2	2	3	2	282.50	1,417.50			52.20	195.85	252.96	2,201.41	
Flathead (Indian).....	2	5	14	9	9	6	5	110.50	1,585.26	1,541.38		481.11	394.91	118.12	3,173.27	
Fort Peck (Indian).....															44.16	
Huntley.....	2	2	2	2	2	1	5								400.81	
Milk River.....	6	6	6	3	3	1	1	731.10	581.77			77.50	78.50	250.81	2,277.65	
St. Mary storage.....									49.87	316.58		47.10	39.60	174.43	2,676.68	
Sun River.....	1	1	1	1	1	1	1	209.44	456.32				1,927.00	83.92	2,430.03	
Lower Yellowstone.....	2	20	3	2	9	2	2	1,066.44	1,277.91	733.00		145.12	1,290.94	77.62	9,230.61	
North Platte.....	1	3	7	8	17	11	12	320.28	1,071.60	2,676.66	3,367.37	1,453.08	841.62	906.80	4,343.60	
Truckee-Carson.....							8			314.96	2,266.45	880.40			33.00	
Carlsbad.....	2	1	1	1	1	1	1					33.00			33.00	
Rio Grande.....	6	2	5	1	1	1	1	63.75	23.44		1,049.70	2,465.71	3,754.88	6,904.49	14,261.97	
North Dakota pumping.....	3	3	1	1	1	1	1	30.00	199.96	123.51	601.21		101.96	1,054.57	12,580.39	
Belle Fourche.....	3	13	14	33	64	7	2	790.40	208.00	192.36		4,134.56	1,226.85	988.00	380.75	
Strawberry Valley.....	3	3	3	28	41	47	18	1,060.50	626.60	4,512.88					1,876.82	
Okanogan.....	11	24	36	39	26	41	12	270.00	90.75	2,013.77	3,773.77	750.88	2,031.23	1,589.79	5,466.73	
Yakima.....	1	2	8	4	17	21	10	2,228.65	1,055.45	140.40		8,685.85		78.00		
Shoshone.....							1	126.25	178.50	134.35						
Umatilla.....																
<b>Total.</b>	<b>63</b>	<b>173</b>	<b>202</b>	<b>328</b>	<b>459</b>	<b>413</b>	<b>656</b>	<b>9,799.54</b>	<b>19,514.23</b>	<b>31,543.80</b>	<b>24,177.13</b>	<b>47,562.31</b>	<b>38,183.11</b>	<b>48,346.44</b>	<b>219,128.56</b>	

\* From Aug. 1 to Dec. 31, 1908.  
 † Payments do not include cost of hospital and medical services, or subsistence, or cost of employment of other persons in place of those injured.  
 ‡ Payments not completed for injuries received in 1914.



## ENGINEERING ARTICLES RELATING TO THE WORK OF THE RECLAMATION SERVICE.

The following is a list of the more important engineering articles relating to the work of the Reclamation Service which have appeared in engineering and technical journals, supplementing lists published in the Reclamation Record of February, 1911, September, 1912, and August, 1913. These lists may be obtained on application to the Reclamation Service.

*General articles.*—Durability of wooden stave pipe (discussion of A. L. Adams's paper by D. C. Henny), Trans. Am. Soc. C. E., June, 1907, vol. 58, p. 74.

Self-insurance of structures by Reclamation Service, Eng. News, Aug. 13, 1908, vol. 60, p. 173.

A system of cost keeping, Myron S. Falk, discussion by F. H. Newell, Trans. Am. Soc. C. E., Sept., 1909, vol. 64, p. 423.

Automatic devices for measuring water used for irrigation, illus., F. W. Hanna, Eng. News, Dec. 17, 1908, vol. 60, p. 666.

Relations of irrigation to navigation, F. W. Hanna, Eng. News, Mar. 25, 1909, vol. 61, p. 316.

Seepage losses from irrigation canals (including savings and table of costs, lining concrete, and treating with oil), R. P. Teele, Eng. Record, Feb. 13, 1909, vol. 59, p. 188.

Constitutionality of the reclamation act (short), Eng. News, Feb. 18, 1909, vol. 61, p. 197.

Irrigation, discussion by F. H. Newell, A. P. Davis, and others, Trans. Am. Soc. C. E., 1909, vol. 62, pp. 10 and 52.

Cost-keeping cards of Reclamation Service (short), Eng. News, Nov. 11, 1909, vol. 62, p. 534; Eng. Record, Nov. 27, 1909, vol. 60, p. 598.

A handsome tribute to the U. S. Reclamation Service, by Senator Newlands (speech), Eng. News, Mar. 10, 1910, vol. 63, p. 283.

Review of hydraulic and excavation tables (147-page book of tables issued by the service), Eng. News, June 16, 1910, vol. 63, litt. sup., p. 65.

\$20,000,000 loan by Congress (short), Eng. News, July 7, 1910, vol. 64, p. 31.

Cooperative fire insurance by U. S. Reclamation Service, Eng. Record, July 9, 1910, vol. 62, p. 30.

Constitutionality of the reclamation act, Eng. News, Aug. 11, 1910, vol. 64, p. 152.

"American Civil Engineer's Pocket Book," Mansfield Merriman, editor, 1st ed., ref. to Reclamation Service structures, pp. 99 to 1113.

Experiments on the flow of water in wood stave pipes, E. A. Moritz, Trans. Am. Soc. C. E., 1911, vol. 74, p. 411.

Priority of invention of automatic cylindrical valves (letter), W. L. Marshall, Eng. Record, Jan. 21, 1911, vol. 63, p. 88.

Hydrometry as an aid to the successful operation of an irrigation system, J. C. Stevens, Trans. Am. Soc. C. E., March, 1911, vol. 71, p. 314.

Graphical design of shoes for bands of wood stave pipe, illus., E. A. Moritz, Eng. News, Oct. 12, 1911, vol. 66, p. 426.

Brief note of service order 1912 (issued by D. W. Cole), Eng. News, Feb. 29, 1912, vol. 67, p. 373.

"Work and publications of the U. S. Government relating to hydroelectric development" (including U. S. Reclamation Service), abstract of paper by J. C. Hoyt, Ann. Convention Natl. Elec. Light Assn., Eng. News, June 27, 1912, vol. 67, p. 1243.

Economies in water and design of works possible by avoidance of excessive seepage losses, E. G. Hopson, Eng. News, July 4, 1912, vol. 68, p. 37.

Concerning engineering research, the useless and the useful (letter), E. A. Moritz, Eng. News, July 17, 1913, vol. 70, p. 129.

Seepage loss from earth canals (with diagrams), E. A. Moritz, Eng. News, Aug. 28, 1913, vol. 70, p. 402.

The economic aspect of seepage and other losses, illus., tables, and diagrams, E. G. Hopson, Trans. Am. Soc. C. E., Dec., 1913, vol. 76, pp. 336-369.

State and national water laws, with detailed statement of the Oregon system of water titles (including discussion by E. G. Hopson and H. T. Cory on the U. S. Reclamation Service), John H. Lewis, Trans. Am. Soc. C. E., Dec., 1913, vol. 76, pp. 637-758.

Comparative cost of public and private projects, illus., A. P. Davis, Eng. News, Jan. 1, 1914, vol. 71, p. 47.

Management of irrigation systems, illus., Robert S. Stockton, Eng. and Cont., Jan. 28, 1914, vol. 41, p. 141.

"Principles of Irrigation Engineering," by F. H. Newell and D. W. Murphy; review of book by J. S. Eastwood, Western Eng., Sept., 1913, vol. 3, p. 231.

Experimental values of Kutters "N" for open channels (from Reclamation Record), Western Eng., Sept., 1913, vol. 3, p. 221.

Attitude of the irrigationists (editorial), Eng. Record, Sept. 6, 1913, vol. 68, p. 253.

Cost of irrigation works per acre of land supplied, with rates (communication), by "Irrigation Engineer," Eng. and Cont., Oct. 1, 1913, vol. 40, p. 376.

An independent opinion on the U. S. Reclamation Service (editorial with extensive quotations from H. T. Cory's paper before Am. Soc. C. E.), Eng. News, Nov. 13, 1913, vol. 70, p. 987.

Personnel of U. S. Reclamation Service Commission (short), Eng. News, Nov. 13, 1913, vol. 70, p. 991.

"Irrigation canals" in India; book reviewed by F. W. Hanna, Eng. News, Nov. 13, 1913, vol. 70, p. 998.

Developments of water power (Oreg. and Federal cooperation), Eng. Record, Nov. 15, 1913, vol. 68, p. 557.

Government forces arbitrating Colorado water-rights disputes, Eng. Record, Nov. 15, 1913, vol. 68, p. 549.

Metal flumes for irrigation canals, illus., F. W. Hanna, Eng. News, Nov. 27, 1913, vol. 70, p. 1077, and Dec. 25, p. 1316.

Engineering principles applied to farm irrigation, illus., A. L. Harris, Eng. News, Dec. 11, 1913, vol. 70, p. 1172.

Flow of water in pipes, with diagram and tables, E. A. Moritz, Eng. Record, Dec. 13, 1913, vol. 68, p. 667.

State and Federal cooperation in irrigation work, E. G. Hopson, Eng. Record, Dec. 20, 1913, vol. 68, p. 685.

Condition on Government irrigation projects, F. H. Newell, Eng. Record, Dec. 20, 1913, vol. 68, p. 703.

Government irrigation work, Franklin K. Lane, Eng. News, Dec. 25, 1913, vol. 70, p. 1322.

State and National water laws, John H. Lewis (with discussion by H. T. Cory of U. S. Reclamation Service work), Trans. Am. Soc. C. E., Dec., 1913, vol. 76, p. 717.

Service records of metal flumes, Eng. Record, Jan. 3, 1914, vol. 69, p. 26.

Eradicating moss and willows from irrigating ditches, Eng. Record, Jan. 10, 1914, vol. 69, p. 40.

Federal v. private irrigation, D. C. Henny, Eng. News, Jan. 15, 1914, vol. 71, p. 120.

The discharge capacity of semicircular steel flumes (illustrated and tables), E. A. Moritz, Eng. News, Jan. 22, 1914, vol. 71, p. 192.

1913 echoes from national irrigation, C. J. Blanchard (in Reclamation Record), with portraits of commission. Water Chronicle, Feb., 1914, vol. 3, p. 92.

Reclamation Service expenditures for 1914, Eng. Record, Feb. 7, 1914, vol. 69, p. 155.

A more liberal policy toward settlers on U. S. Reclamation Service projects (short), Eng. News, Feb. 12, 1914, vol. 71, p. 337.

A conference on the irrigation situation (short), Eng. News, Feb. 12, 1914, vol. 71, p. 374.

Great activity in the U. S. Reclamation Service (proposed expenditure of \$23,000,000 in 1914), Eng. News, Feb. 12, 1914, vol. 71, p. 376.

The answer to "What is the matter with irrigation?" E. P. Osgood, Eng. News, Feb. 19, 1914, vol. 71, p. 408 (includes cost of farming).

Investigation of concrete drain tile in alkali regions (F. W. Hanna on committee), Eng. News, Feb. 26, 1914, vol. 71, p. 480.

Irrigation conference at Denver (short), Eng. News, Apr. 16, 1914, vol. 71, p. 866.

Denver conference on irrigation development, Eng. Record, Apr. 25, 1914, vol. 69, p. 254, supplement.

The Greeley-Poudre Irr. Dist., Colo., letter, A. P. Davis, Eng. News, Apr. 30, 1914, vol. 71, p. 977.

Another answer to "What is the matter with irrigation?" W. W. Patch, Eng. News, May 14, 1914, vol. 71, p. 1061.

Epitome of national reclamation, illus., C. J. Blanchard, Amer. Forestry, June, 1914, vol. 20, p. 393.

New cylindrical valve and some wood dam crests, illus., William L. Marshall, The Water Chronicle, June, 1914, vol. 3, p. 265.

Use of concrete pipe by U. S. Reclamation Service, The Water Chronicle, June, 1914, vol. 3, p. 298.

Some movable dam crests, illus., W. L. Marshall, Eng. News, June 4, 1914, vol. 71, p. 1264.

Synopsis of hearings (Borland Com.) on the present status of reclamation projects, Eng. and Cont., June 10, 1914, vol. 41, p. 671.

Sir William Willcocks's appointment as consulting engineer, U. S. Reclamation Service (short), Eng. News, June 11, 1914, vol. 71, p. 1337; see also brief biography, Eng. News, March 12, 1914, vol. 71, p. 591.

Movable crests for dams, illus., W. L. Marshall, Eng. Record, June 20, 1914, vol. 69, p. 708.

Losses of water in irrigation systems (with tables), P. M. Fogg, Eng. and Cont., June 24, 1914, vol. 41, p. 720.

Excavation done by U. S. Reclamation Service (diagram), W. I. Swanton, Eng. Record, July 11, 1914, vol. 70, p. 58.

Interstate difficulties over water rights, Com. of Am. Soc. C. E., F. H. Newell, chairman, Eng. Record, July 11, 1914, vol. 70, p. 42.

"Irrigation in Egypt" (review of Sir William Willcocks's book by F. H. Newell), Eng. News, July 16, 1914, vol. 72, p. 162.

Government aid to irrigation in United States and Australia, Elwood Mead, Eng. News, July 30, 1914, vol. 72, p. 234; also in Eng. Record, June 13, 1914, p. 668.

Irrigation manager and his legal problems, illus., F. H. Newell, Jour. of Elec., Power and Gas, Aug. 1, 1914, vol. 33, p. 95.

Hydroelectric developments on public lands in relation to irrigation, E. C. Finney, Jour. of Elec., Power and Gas, Aug. 1, 1914, vol. 33, p. 100.

Large balanced valves for reservoir outlets (letter), O. H. Ensign, Eng. Record, Aug. 8, 1914, vol. 70, p. 171.

Irrigation in America and Victoria; lessons to be learned, Elwood Mead, Eng. Record, Aug. 22, 1914, vol. 70, p. 220.

The human side of irrigation, F. H. Newell, Eng. Record, Aug. 29, 1914, vol. 70, p. 236 (editorial on "Irrigation management as against irrigation engineering," p. 234).

The manager of an irrigation project, Western Eng., Sept., 1914, vol. 5, p. 116; brief note on p. 95.

Effect of the European war on American industry, interview with Franklin K. Lane, Western Eng., Sept., 1914, vol. 5, p. 125.

What the U. S. Reclamation Service has accomplished (table), Eng. Record, Sept. 12, 1914, vol. 70, p. 296; editorial, p. 285.

Subsoil investigations (paper by J. L. Burkholder before Idaho Soc. of Engineers), Eng. Record, Sept. 26, 1914, vol. 70, p. 349.

Electrical features of the U. S. Reclamation Service (with tables), F. H. Newell, Proc. Am. Inst. Elec. Eng., Oct., 1914, vol. 33, p. 1583.

Drainage construction on U. S. Reclamation projects (short), Eng. News, Oct. 1, 1914, vol. 72, p. 705.

Welding the organization together (editorial with reference to enlarged scope of Reclamation Record), Eng. Record, Oct. 3, 1914, vol. 70, p. 366.

Payment for construction charges of irrigation projects (short), Eng. News, Oct. 8, 1914, vol. 72, p. 719.

The Twenty-first International Irrigation Congress (at Calgary, Canada), F. H. Newell, Eng. News, Oct. 22, 1914, vol. 72, p. 843.

Cost of draining overirrigated lands on the U. S. Reclamation Service projects (editorial), Eng. and Cont., Oct. 28, 1914, vol. 42, p. 397.

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Progress in irrigation, 1914, F. H. Newell, Eng. Record, Jan. 2, 1915, vol. 71, p. 13.

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Preliminary estimating of canal excavation (illus. with diagrams), Lewis M. Hammond, Eng. Record, Jan. 30, 1915, vol. 71, p. 146.

Human element in irrigation management, F. H. Newell, Western Eng., Feb., 1915, vol. 5, p. 330.

Methods and costs of constructing concrete lining for 20 irrigation canals (staff article), illus., Eng. and Cont., Feb. 10, 1915, vol. 43, p. 130.

"Construction of masonry dams," by Chester W. Smith (including description of dams built by U. S. Reclamation Service), review of book by editor, Eng. Record, Feb. 13, 1915, vol. 71, p. 210.

Suggested itinerary for engineers desiring to visit Reclamation Service projects, *Eng. News*, Feb. 18, 1915, vol. 73, p. 363.

"Use of water in irrigation," by Samuel Fortier, review by F. W. Hanna, *Eng. Record*, Feb. 20, 1915, vol. 71, p. 243.

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Scientific operation of irrigation systems, F. H. Newell, *Pac. Builder and Eng.*, Mar. 20, 1915, vol. 19, p. 115.

"Principles of irrigation practice," by J. A. Widtsoe, review by F. H. Newell, *Eng. Record*, Mar. 27, 1915, vol. 71, p. 405.

"Working data for irrigation engineers," by E. A. Moritz, brief notice, *Eng. Record*, Mar. 27, 1915, vol. 71, p. 405.

Proposed experiments and observations (from Reclamation Record), *Eng. News*, Apr. 8, 1915, vol. 73, p. 659.

"Working data for irrigation engineers," by E. A. Moritz, review by B. A. Etcheverry, *Eng. Record*, Apr. 17, 1915, vol. 71, p. 498.

Unused irrigation canals, F. H. Newell, *Eng. News*, Apr. 1, 1915, vol. 73, p. 632.

Hanna irrigation flow meter (short), *Eng. News*, Apr. 1, 1915, vol. 73, p. 656.

"Practical irrigation and pumping," by Burton P. Fleming, review by F. W. Hanna, *Eng. Record*, Apr. 3, 1915, vol. 71, p. 436.

"Working data for irrigation engineers," by E. A. Moritz, review, *Eng. and Cont.*, Apr. 28, 1915, vol. 43, p. 388.

What an engineer should know about water rights, Morris Bien, *Eng. and Cont.*, May 5, 1915, vol. 43, p. 412.

F. H. Newell appointed professor of civil engineering and head of department of civil engineering, Univ. of Ill. (news item), *Eng. News*, May 6, 1915, vol. 73, p. 911.

F. H. Newell succeeds Prof. Ira O. Baker at Illinois Univ. (portraits), *Eng. Record*, May 8, 1915, vol. 71, p. 599; note of address by Mr. Newell, p. 603.

The new professor of civil engineering at Illinois Univ. (portrait), biography of F. H. Newell, *Eng. and Cont.*, May 12, 1915, vol. 43, p. 23, sup.

Valve used in large dams of federal projects, illus., A. P. Connor, *Practical Engineer*, May 15, 1915, vol. 19, p. 481.

Revaluation of Reclamation Service projects under way (news item), *Eng. Record*, May 22, 1915, vol. 71, p. 663.

Suggests national movement for engineering publicity (part of address by F. H. Newell), *Eng. Record*, May 22, 1915, vol. 71, p. 666.

Will utilize existing irrigation works to secure useful data (March issue of Reclamation Record), *Eng. Record*, May 29, 1915, vol. 71, p. 674.

National homemaking, illus., C. J. Blanchard, *Paper Trade Journal*, June 3, 1915, vol. 60, p. 46.

Irrigation engineering data, review of "Working data for irrigation engineers," by H. B. Muckleston, *Eng. News*, June 17, 1915, vol. 73, p. 1170.

Engineers will discuss plans for nation-wide cooperative movement, *Eng. Record*, June 19, 1915, vol. 71, p. 766; editorial, p. 762.

Corrosion of metal flume sheets, I. C. Harris (from Reclamation Record), *Jour. of Elec., Power, and Gas*, June 26, 1915, vol. 34, p. 542.

F. H. Newell urges cooperative engineering publicity, *Eng. Record*, July 3, 1915, vol. 72, p. 29.

Corrosion of "pure irons" and steels used by U. S. Reclamation Service, I. C. Harris (from Reclamation Record), *Eng. News*, July 8, 1915, vol. 74, p. 78.

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Data on the life of wooden pipe pertaining to 79 pipe lines (from Reclamation Record), D. C. Henny, Eng. and Cont., Aug. 18, 1915, vol. 44, p. 127.

Cement drain tile in alkali soils tested for durability (extract from Bureau of Standards report, experiments on U. S. Reclamation Service projects—Technologic Paper No. 44), by R. J. Wig and G. M. Williams, Eng. Record, Aug. 21, 1915, vol. 72, p. 220.

Report on life of wood pipe (with tables), D. C. Henny, Eng. News, Aug. 26, 1915, vol. 74, p. 400.

Library of irrigation data (extract Reclamation Record), The Contractor, Sept. 15, 1915, vol. 22, p. 33.

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Does irrigation pay? F. H. Newell, Eng. Record, Sept. 25, 1915, vol. 72, p. 384.

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